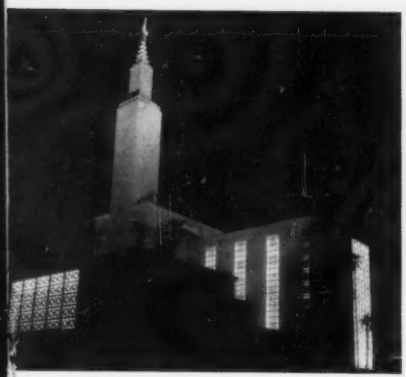
ELECTRICAL WEST

January 1956
25 Cents

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED REGION OF THE U. S.

Salmon May Get "Ski Jump" Exit . . 64



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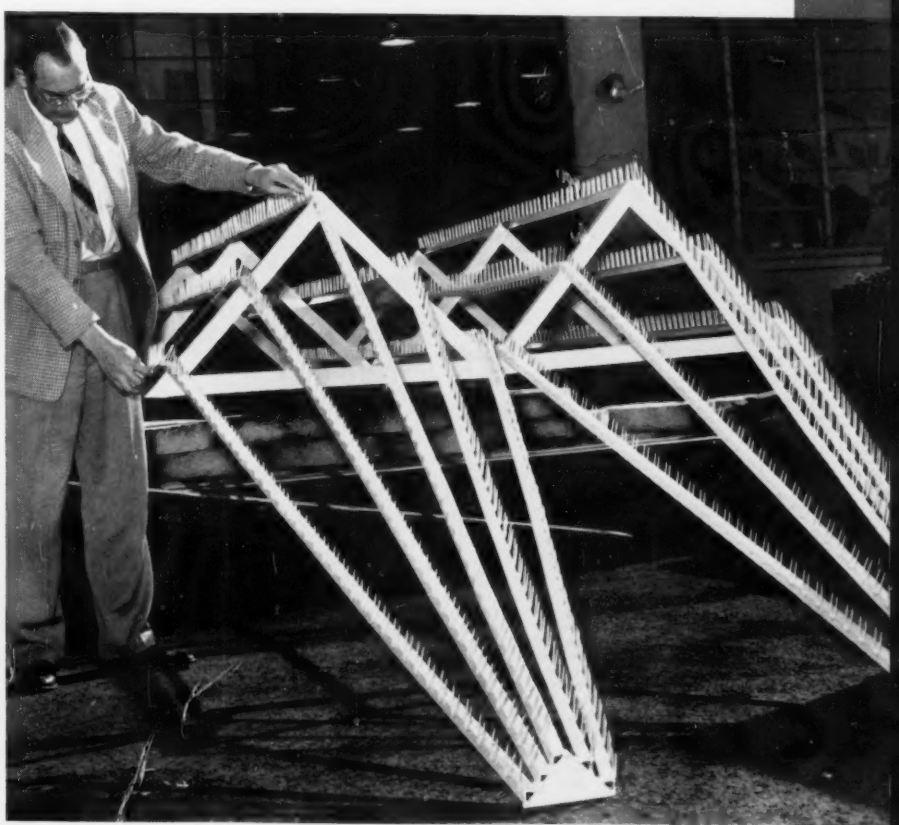

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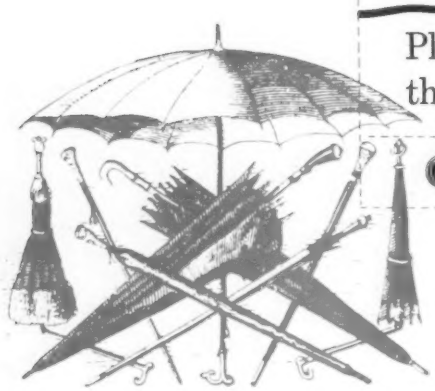

WHEN IT RAINS...IT SELLS!

What . . . sell better during the "rainy season" than under the bright warm sun? Yes, some things do. To name a few: raincoats, umbrellas, windshield wipers . . . and electric clothes dryers.

Any homemaker with a weather-beaten washday is likely to be in the market for an electric clothes dryer. If it hasn't actually taken shape in her mind, Edison "rainy season" advertising will help. In newspapers and magazines, outdoors and through the mail, Edison advertisements suggest that Mrs. Homemaker free herself from postponed washdays and clothes-drying drudgery . . . that she "PLUG IN THE SUN" through the magic of an electric clothes dryer.

There's a "plug" in these messages for appliance dealers, too. Tie-ins may well prove that rain is good for *sales*, as well as flowers. "Edison tells them, and the dealer sells them!"

Edison

Good Service, Square Dealing, Courteous Treatment

SOUTHERN CALIFORNIA EDISON COMPANY

MORE LIGHT PER DOLLAR

Pat. Pend.

with

REVOLUTIONARY NEW SMOOT-HOLMAN

PERFECT VISION

LUMINOUS INDIRECT LUMINAIRE

Using New 800 Milliampere Lamps

Totally new in conception, design, performance. Takes full advantage of the high output of new 800 MA., rapid start lamp. The only indirect luminaire available that *mounts within 12 inches of ceiling without severe light blocking.* Slender lines and open construction pass amazing percentage of upward light back to work surface . . . Gives you *far more light per dollar* than ever thought possible. Louvering effect of fixture subdues ceiling brightness. No pronounced ceiling pattern. Faultless light distribution; its comfort and quality astonishes everyone.

By all means, investigate this exciting new fixture promptly. The more you know about it, the more use you'll find for it. Its possibilities are limitless. Where shall we send your complimentary file of technical data? Kindly mention this publication and our catalog number, PV-288.

Features

- Upward and downward light balanced for best seeing.
- High efficiency.
- Brightness meets ASA school lighting standards.
- Mounts within 12" of ceiling without blocking return light.
- Near perfect visual comfort in any size room.
- High adaptation level yet low brightness and brightness ratios.
- Economical to install.
- Easy to maintain.
- Harmonizes well with modern architecture.
- Extremely flexible in arrangement.

SMOOT-HOLMAN COMPANY

INGLEWOOD CALIFORNIA

SMOOT-HOLMAN — ILLUMINATION EQUIPMENT — INGLEWOOD, CALIFORNIA

We Support the National Lighting Bureau

OUR SERVICE IS LIMITED TO THE WEST AND SOUTHWEST

ELECTRICAL WEST

SPOKESMAN FOR MOST HIGHLY ELECTRIFIED REGION OF THE U. S.

THE ALL-INDUSTRY MAGAZINE OF PROGRESS, ESTABLISHED 1887,
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Next Month

February is the annual construction and statistical issue. Regular features are: review of 1955 construction; budgets for 1956 and major betterments planned; calendar of new generation; Far West and national statistics; utility sales programs and plans (sales accomplishments for 1955 will be published in the March issue). Look for an information-packed issue that will provide a reference work for the entire year.

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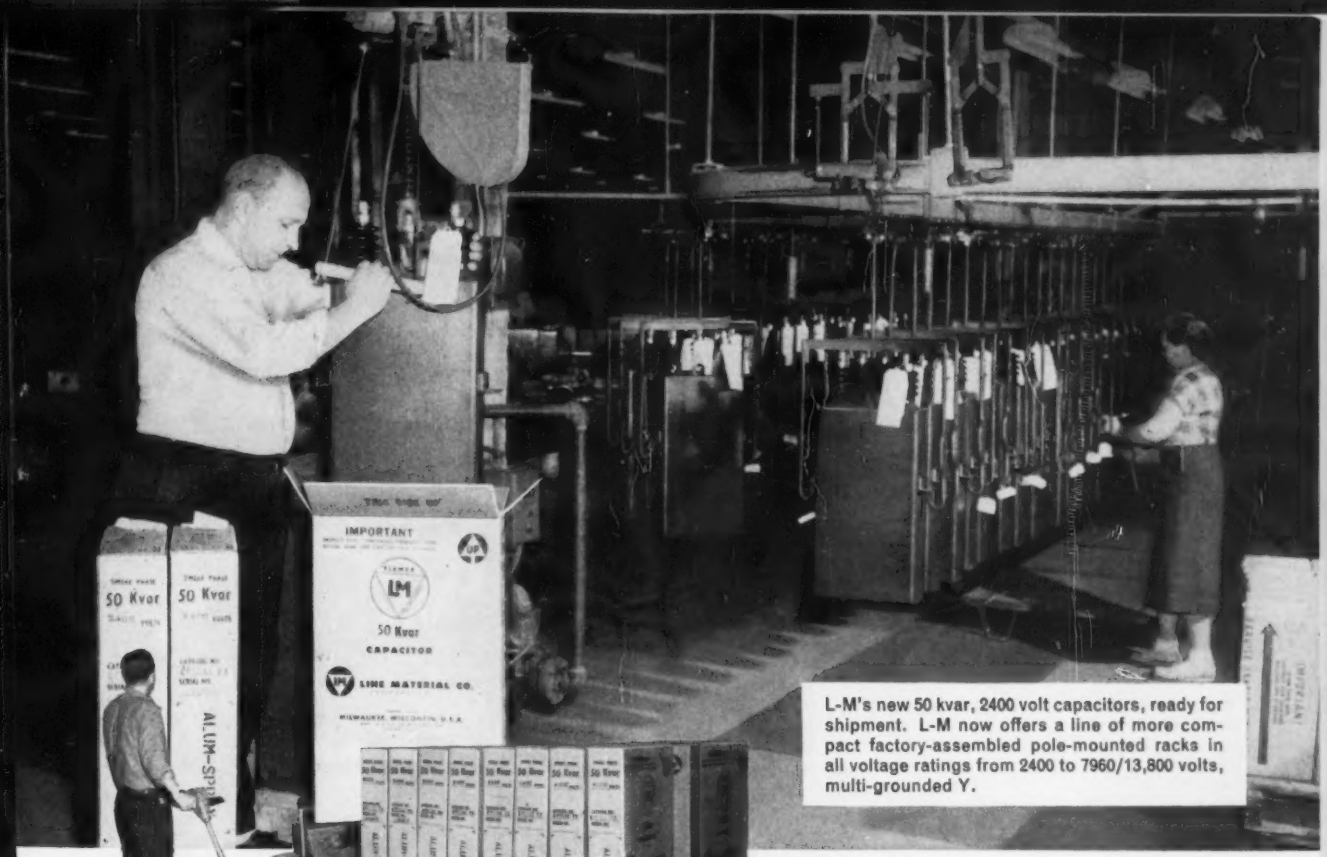


L-M's new 50 kvar, 2400 volt capacitors, ready for shipment. L-M now offers a line of more compact factory-assembled pole-mounted racks in all voltage ratings from 2400 to 7960/13,800 volts, multi-grounded Y.

OFF THE PRODUCTION LINE...

You, too, can enjoy the benefits of L-M's **New 50 kvar** Capacitors NOW

Shipments have started on Line Material's new 50 kvar Elemex Capacitor. The unit is an outstanding achievement in capacitor engineering and production. It has the same width, same thickness as a 25 kvar capacitor. Only ten inches of additional height give you twice the capacity.

Per kvar, L-M's new 50 kvar capacitor is lighter, requires less pole space, and takes less installation time. Thus, installed cost per kvar is lower. It meets applicable NEMA standards for 25 kvar capacitors.

Ask the L-M Field Engineer for information on features, design and delivery of the new 50 kvar capacitor and capacitor equipments. Or write Line Material Co., Milwaukee 1, Wis. (a McGraw Electric Company Division).

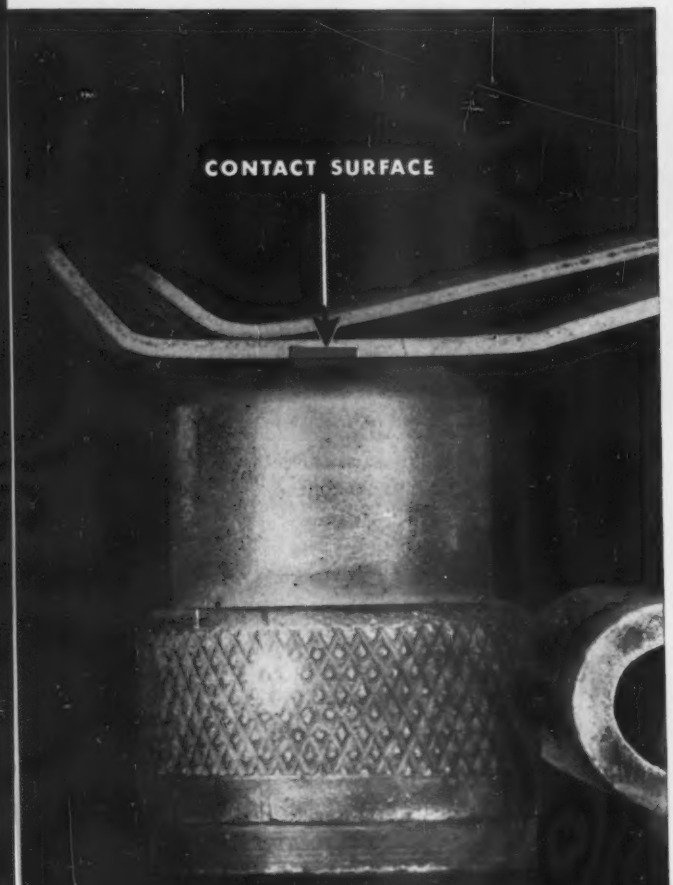
LINE MATERIAL

Elemex® Capacitors

244

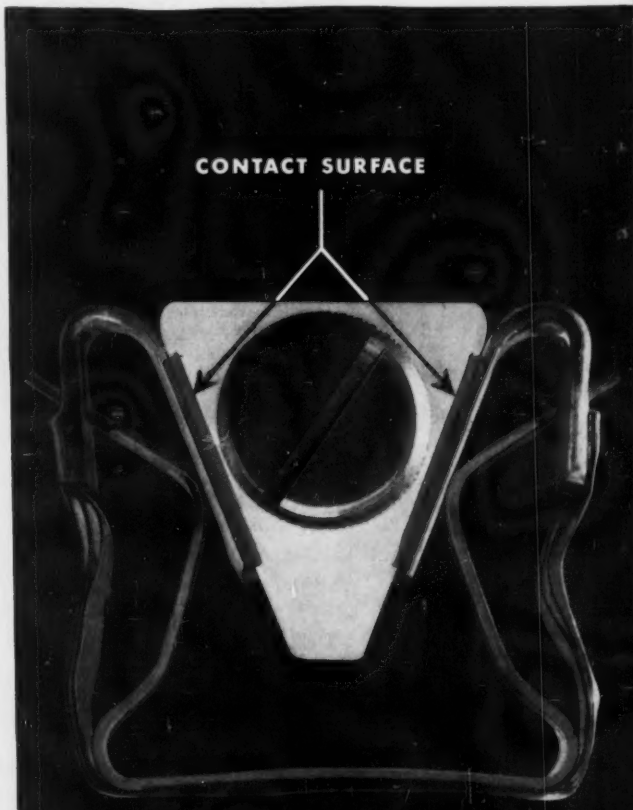
old

Ball-point contacts hit on only one spot. Can result in pitting, wear, corrosion—and possible overheating.



new

"V"-wedge contacts line up solidly, both sides . . . make for a high-pressure, multi-point, low-resistance contact.



ALL-NEW ENCLOSED FUSE CUTOUTS

now...

Self-aligning 'V'-wedge contacts have multi-point contact surfaces, add years to cutout life

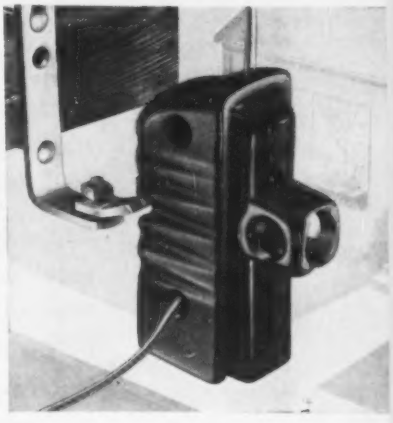
Cutout life is extended in General Electric's all-new Enclosed Fuse Cutout line because of this unique construction which gives positive high-pressure, multi-point, low-resistance contact. In addition, these exclusive "V"-wedge contacts are free-floating and self-aligning—to assure you of positive contact every time. Broad surfaces of contacts are silver plated to protect against corrosion and maintain low resistance.

EVEN AFTER YEARS OF SERVICE, the faces of these "V"-wedge contacts stay bright, clean, shiny. Resistance is kept low—and cumulative overheating doesn't even get a chance to cause an outage.

In old-style contacts, pitting, arcing and overheating could result from single-point contact—G.E.'s completely new "V"-wedge contacts eliminate these difficulties.

EVERYTHING IN ONE LINE—G.E.'s new Fuse Cutout line gives you all functions—indicating-dropout, indicating-non-dropout, disconnect—in one basic design. You get two current ratings, 50 and 100 amperes, and two voltage ratings, 5.2 and 7.8 kva, to match every possible system demand.

LINEMEN WILL LIKE the other new features of the new G-E Fuse Cutout line. The safety-grip door handle, for instance, that ends switch-stick juggling—and the unique plastic-to-metal latching that prevents door "freezing." In addition, fusing and line connecting have been made extra easy for fastest possible installation and servicing. For a complete description of the new cutout line, write for Bulletin GEA-6208, General Electric Company, Section 433-13, Schenectady 5, New York.



THIS NEW G-E FUSE CUTOUT

has all the features most engineers and linemen prefer. Logically so, too—hundreds of reports of the features they wanted were collected and evaluated. Their best ideas were incorporated into the new cutout design.

Progress Is Our Most Important Product

GENERAL ELECTRIC

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

Justly proud of their recent Day-Brite installation, Messrs. N. W., J. E. and F. R. Forsberg of Wasatch Electric Company stand in the main banking area of the First Security Bank, Salt Lake City.

"Day-Brite easy to install"

"We of Wasatch Electric Company feel that additional prestige has come to our organization through participation in the construction of such an outstanding building. Inside and out, this structure shows high-class design and mechanical workmanship.

"Final selection of Day-Brite was based upon our previous years of experience with these fixtures. We feel that our judgment has been vindicated by the ease and simplicity of installation and by the neat, clean finished appearance."

This direct testimony by the Messrs. Forsberg is typical of the experience of electrical contractors all over the country.

61103

"DECIDEDLY BETTER"
DAY-BRITE
Lighting Fixtures

Day-Brite Lighting, Inc.
5412 Bulwer Ave.
St. Louis 7, Missouri

NATION'S LARGEST MANUFACTURER OF COMMERCIAL AND INDUSTRIAL LIGHTING EQUIPMENT

The link between you and satisfied customers

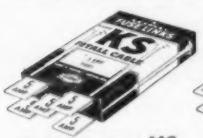
KEARNEY
FUSE LINKS

● *To restore service faster*

Linemen work faster when all they need to do is pull the handy KEARNEY Fuse-Pak tab to unpack a fuse link. It's by far the most efficient method of packing . . . particularly when men are wearing heavy gloves and working in bad weather. As an added help, every KEARNEY Fuse-Pak is brightly color-coded to save time and prevent mistakes.

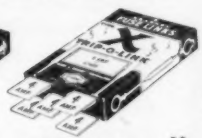
● *To prevent unnecessary outages*

You can keep even the most troublesome circuits in operation safely with these "coordination-engineered" KEARNEY Fuse Links. They are available in six types to suit your particular requirements:



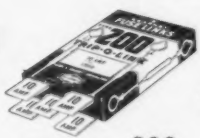
KEARNEY Type KS

Specially designed to protect and still keep outages at a minimum on circuits subject to switching and lightning surges. KS overload capacity is identical with Type 200, but surge capacity is twice as great.



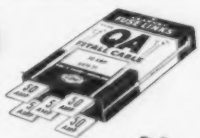
KEARNEY Type X

A specialist at keeping transformers in service during heavy overloads and surges... yet clears the fault before damage range is reached. Opens 230% of rated current within five minutes.



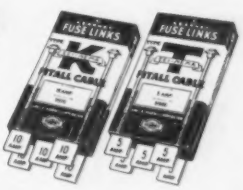
KEARNEY Type 200

Specially made for troublesome circuits that are subject to long-time overloads and surges. Overloads up to 150% can be carried indefintely without damage to fuse link or cutout.



KEARNEY Type QA

The QA link is designed to open at a lower percentage of rated current, and therefore will melt more rapidly than fuse links of the same ampere rating which have been designed to open 230% of rated load within five minutes.



KEARNEY Type K

EEI-NEMA standard fast fuse link.

KEARNEY Type T

EEI-NEMA standard slow fuse link.

JRK 283W

For Better Construction . . . Safer Maintenance

Specify **KEARNEY** *The Mark of Quality* **PRODUCTS**

JAMES R. KEARNEY CORPORATION ST. LOUIS, MO. GUELPH, ONT.

MAYDWELL & HARTZELL, *INCORPORATED* • **WEST COAST DISTRIBUTORS** • Los Angeles • San Francisco • Portland • Seattle • Spokane • Phoenix

Compare pole top appearance!

KPF Switches

modern functional attractive

KPF Air Break Switches look different because they are different. Their pole top appearance is neat and uncluttered. There is a "straight-through" cleanliness of line—the visual appeal of design simplicity.

With this simplicity goes operating dependability and long life. There are no delicate mechanisms to malfunction, freeze, lock from cross-arm warping, need lubrication or wear out. This same simple construction also saves weight. KPF phase units weigh about the same as a comparable insulator stack. Double cross-arms and extra bracing are not needed. Installation is faster and less expensive.

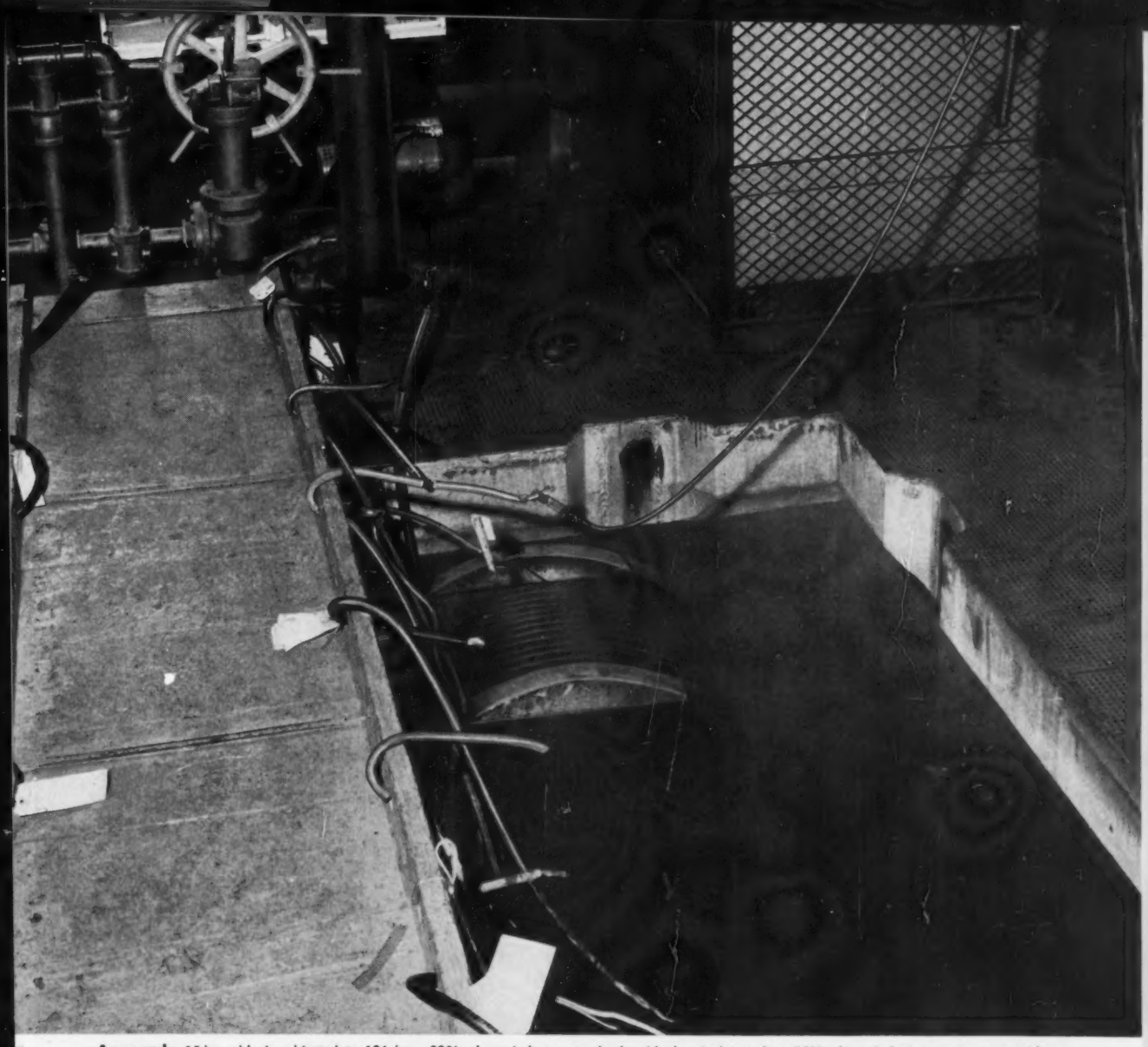
KPF Switches have proved themselves in nearly a half century of major system operation. Why not get the details and make a test installation.

KPF
AIR BREAK SWITCHES
Standard for nearly half a century

For catalog and complete specifications, write direct

KPF ELECTRIC COMPANY
Dept. W. 1624 E. Alpine Avenue
Stockton 5, California

B469



Anaconda 15-kv cable is subjected to 106 kv — 33% above industry standards with d-c. And tested at 25% above industry requirements with a-c.

15-KV CABLE GOES

Skin diving at 106 kv

Anaconda Type AB butyl-insulated high-voltage cable is tested under water at 600% overvoltage to assure you peak performance.

The fact that two high-voltage cables may look alike does not mean they'll perform alike. At Anaconda, 15-kv cable is tested at 106 kv with d-c for fifteen minutes. This voltage is *33% above industry standards with d-c.* And in addition, Type AB is tested at *25% above industry requirements with a-c.*

Only a vastly superior insulation can stand such high test voltage, even though there is no defect in the cable.

For your assurance of maximum service, Anaconda butyl-insulated cables are designed to perform far beyond industry requirements — in every important electrical and physical property.

New Engineering Bulletin EB-27 gives you full details on performance of Type AB insulation in 15 Industry Specification tests. Ask the Man from Anaconda for your copy. Or write: Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y. 56294

Get all the facts on Anaconda Butyl. Write today —

SEE THE MAN FROM ANACONDA®

pioneer in **BUTYL INSULATION**

FASTEST WESTERN SERVICE — At Orange, California, Anaconda's expanded, modernized mill fabricates and stocks copper and aluminum wire and cable for *every type of application.* Anaconda's Western Distributors thus can assure the fastest possible service on all West Coast needs. See Anaconda Sales Offices: Los Angeles, San Francisco, Seattle, Denver.

DROP FORGING makes

See the *DIFFERENCE* Drop Forging makes

BTC FORGED CLAMP

Fibrous grain structure of metal conforms with shape of clamp . . . making clamp stronger, tougher, while permitting lighter-weight design.

CAST CLAMP

Metal has no fibrous structure. Lower yield and tensile strengths . . . heavier sections necessary in critical areas . . . has undesirable mass.

Specify BTC **Drop-Forged Hi-Line Hardware**

BTC

conductor strain clamps *better*

BTC STRAIN CLAMPS offer a dependable, efficient method of dead-ending conductors on strain and angle construction.

They are designed for all conductors in general use . . . for all classes of construction . . . for all voltages . . . for all line current loads . . . and for all conditions of atmospheric corrosion.

5000 SERIES
Steel Strain Clamps. Drop-forged steel, hot-dip galvanized, suitable for all conductors.

5200 SERIES M.P.L.
(Minimum Power Loss) Aluminum Strain Clamps. Drop-forged, heat-treated Aluminum Alloy Clamps for A.C.S.R. and All-Aluminum Conductors. BTC Minimum Power Loss Clamps reduce hysterisis and eddy current power losses, eliminate conductor heating effects and improve corrosion resistance.

The general design of BTC Conductor Strain Clamps combines the superior mechanical properties and lighter weight of forged metal parts with a considerable reduction of the factors that cause conductor-vibration damage. Slip strengths are more than adequate.

Installation of these clamps is both easy and economical. No special tools are required. The conductor may be strung between clamps or from clamp to apparatus without cutting or splicing, insuring permanently trouble-free operations.

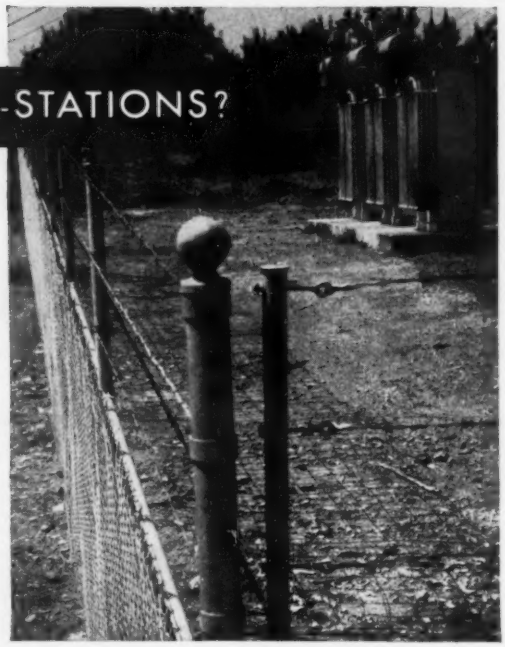
BTC offers you a complete line of Conductor Strain Clamps, in a wide range of sizes, enabling you to select just the right clamp for your conductor.

BTC

The BREWER-TITCHENER CORPORATION
Cortland, N. Y.

. . . From Your Insulator Manufacturer

WEEDS AROUND SUB-STATIONS?



"Telvar" is ideal for weed control around fences, poles, towers. It's low in toxicity to humans and animals, non-volatile, non-flammable and non-corrosive to equipment.

One application of

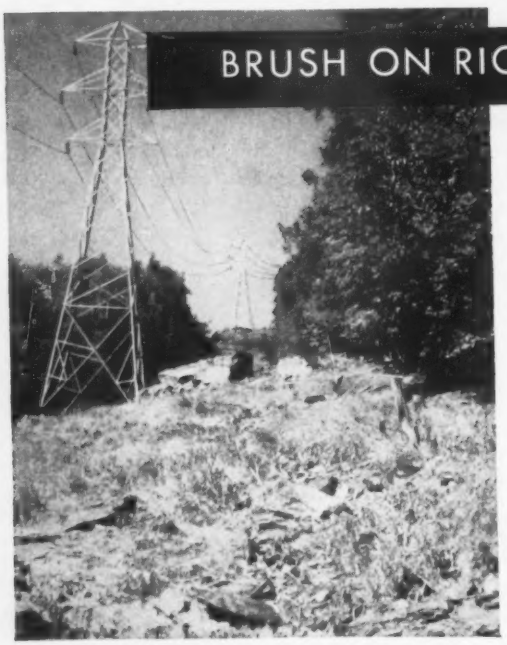
Du Pont Telvar®

WEED KILLERS

stops weeds for the season—or longer!

"Telvar" kills weeds through the roots . . . prevents regrowth. Low rates (20 to 80 lbs. per acre) make it cost little for the results you obtain . . . also mean less handling, fewer storage problems. To cut maintenance costs to new low levels, put "Telvar" in your weed-control program. Available in two formulations: "Telvar"W, and "Telvar" DW.

BRUSH ON RIGHT-OF-WAY?



"Ammate" applied five years ago, is still keeping brush down along this right-of-way. "Ammate" allows low-growing cover to return to resist erosion.

One application of

Du Pont Ammate X®

WEED AND BRUSH KILLER

kills more kinds of brush —safely—at lower cost!

"Ammate" X kills more kinds of brush and keeps it down longer than most weed and brush killers! When the original spray job is done well, brush is kept under control for years with only an occasional spot spray. You can rely on "Ammate" X to do the job safely, even where your right-of-way adjoins cropland, because "Ammate" X is not volatile. There are no vapors to drift onto sensitive crops. It is no hazard to crews, stock or wildlife.

FREE ILLUSTRATED BOOKLET (A-139) describes season-long weed control with "Telvar." Shows results in West Coast areas. For your copies, write to Du Pont, Grasselli Chemicals Dept., 111 Sutter St., San Francisco 4, Calif.

On all chemicals always follow directions for application. Where warning or caution statements on use of the product are given, read them carefully.

Telvar® Weed Killers for industrial use

DU PONT REG. U. S. PAT. OFF.

Ammate X® Weed and Brush Killer

BETTER THINGS FOR BETTER LIVING.. *THROUGH CHEMISTRY*

CURRENT TRANSFORMERS from 200 to 4000 amperes, 600 volts and below for indoor or outdoor use

TYPE BKM
for 1200 and 1500-ampere use has an opening 4¼" high, 1¾" wide for the primary conductor.
TYPE TWM
is available in 200, 400, 600 and 800 amperes, with intermediate ratings obtainable by passing the primary conductor through the 1⅜"x 2¾" opening more than once.
TYPE BKM
for 2000, 3000 and 4000-ampere application has large 4¼" square opening for primary conductor

Completely Molded in Thermo-setting Resin

No Maintenance

Maintenance is eliminated on all Allis-Chalmers service-proved molded current transformers. They are molded in a thermo-setting resin with an inherent toughness which assures long life and resistance to all kinds of weather. The molded resin serves as insulation, support and casing for the transformer.

Only secondary terminal inserts and base mounting inserts protrude from the molded body. A perfect seal is established because of the excellent adhering qualities of the resin.

Tests Prove Fire Safety

Allis-Chalmers molded current transformers will never be a fire hazard. Tests prove they will not support combustion or add to a fire's intensity — an important thing to look for in a current transformer.

Designed for Versatile Installation

You can mount these transformers in any position. Bases of all nuts can be removed to mount on any convenient flat surfaces — bars, channels, walls, etc., with ⅜" bolts. Bases of Type TWM units can be rotated.

A removable short-circuiting device and sealable secondary terminal cover are standard on all units. A conduit box can be substituted for the secondary terminal cover. For all units 1500 amperes and below there is available a "Do-It-Yourself" conversion kit to change over to a 5000-volt bar-type unit.

Get complete information. See your nearby A-C office or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin. A-4876

ALLIS-CHALMERS

Lapp Builds the

. . . to give extra years of operating

Shipments today of Lapp Line Posts are at an all-time high. Most of them are going to companies which bought their first Lapp Line Posts fifteen, twenty, even twenty-five years ago. On the record, the performance of these earliest Lapp Posts (and all since)—has never been approached by any other line insulator. There are good reasons for such a record—the original idea of a Post as an insulator designed to take advantage of the *strength* of porcelain (rather than to impose on its weakness)—and *the way Lapp builds* the Post, which assures in service every promise in theory ever made for it.

Lapp Insulator Co., Inc., Le Roy, New York.

NO CONDUCTIVE GLAZE • Lapp Line Post by *design* is free of radio and TV interference. No corona is formed at operating voltages, so no "treatment" is required.

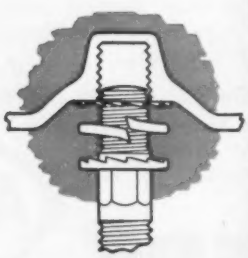
ONE PIECE PORCELAIN BODY • Porcelain is ten to twenty times as strong in compression as it is in tension. Lapp Post design eliminates nested porcelain parts, pins or other inserts, avoids internal strains. Stiffest under deflection.

FOG-TYPE LEAKAGE CORRUGATIONS • Multiple petticoats provide extra leakage distance and uniform leakage path; spaced for natural cleaning—wind and rain flush off contamination, keep surface resistance high.

SMALL DIAMETER • Lapp Line Post gets its flashover and leakage values from height rather than spread; easy for use with hot line tools.

SHORT, STURDY PETTICOATS • Maximum protection for insulator body under impact and flashover.

HARDWARE EXTERNALLY ATTACHED • Bases (and caps on Clamp-top Lapp Line Posts) are cemented ON. Porcelain is loaded only in a large-area low intensity compression grip.

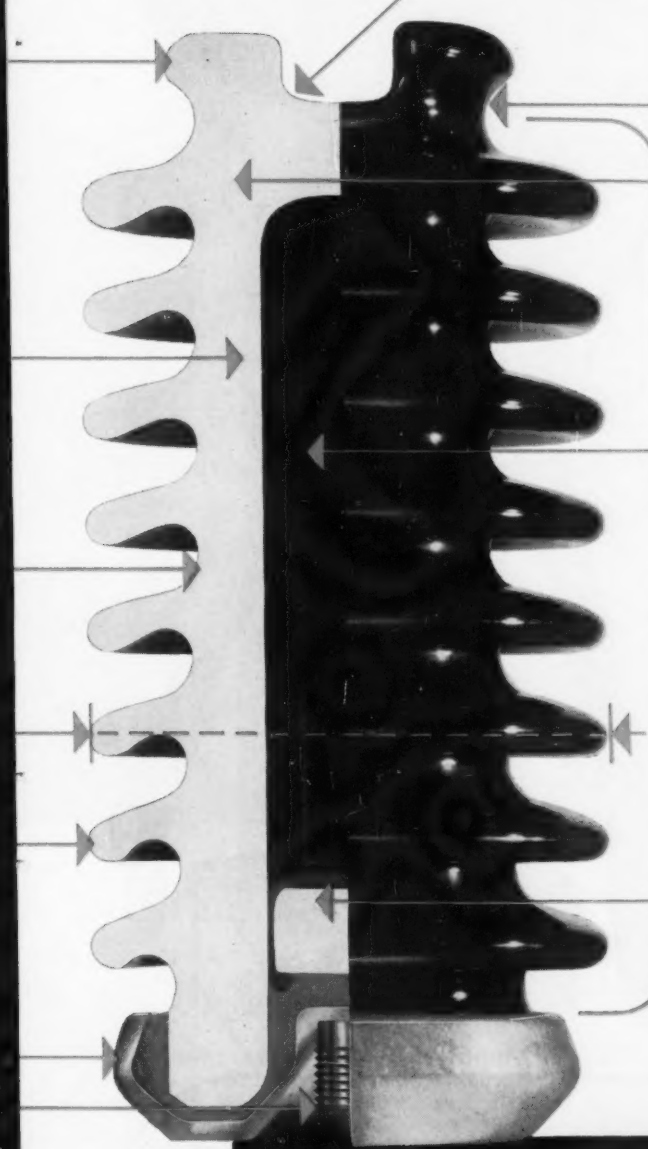


INTERCHANGEABLE STUD BOLTS • Easier stock inventory—separable long or short studs may be installed in the field. A positive lock washer, cooperating with serrated surfaces in insulator base and stud, permits easy removal, but locks stud against line vibration.

WESTERN REPRESENTATIVES:
Los Angeles: Earl S. Condon Co.
San Francisco: C. E. Ingalls & Sons
Seattle: Charles F. James
Butte: R. E. McDonough Co.
Salt Lake City: Riter Engineering Co.

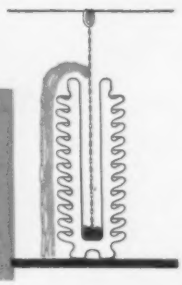
Line Post

security



LARGE CONDUCTOR GROOVE • Square-side top grooves meet new EEI-NEMA standards—provide for conductors of diameters up to 1 ½".

EASY TYING • Conductor groove, side groove and lip designed for fast, secure tie-wire attachment.

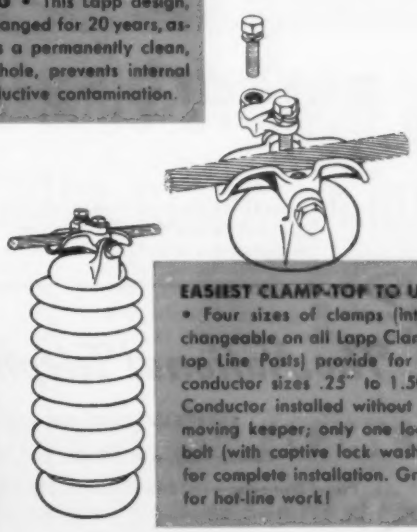


SOUND PORCELAIN • 100% electrical test before plugging or assembly—3-minute 60 cycle flashover from chain dropped entire depth of hole in inverted porcelain—assures soundness of head, soundness of whole porcelain.

INSIDE GLAZED • All Lapp Post porcelains are glazed inside and out—an extra-quality feature that makes for added cleanliness and more critical visual inspection.

LIVE TERMINALS are separated by full length of the insulator. Loss of one or more petticoats does not reduce flashover distance.

PORCELAIN and RUBBER PLUG • This Lapp design, unchanged for 20 years, assures a permanently clean, dry hole, prevents internal conductive contamination.



EASIEST CLAMP-TOP TO USE • Four sizes of clamps (interchangeable on all Lapp Clamp-top Line Posts) provide for all conductor sizes .25" to 1.50". Conductor installed without removing keeper; only one loose bolt (with captive lock washer) for complete installation. Great for hot-line work!

Lapp

Nicopress

The Tool and the Sleeve

that are made to work together

together they make the perfect splice

Nicopress Sleeves and Tools Patented in U. S. and Foreign Countries. "Nicopress" Registered in U. S. and Foreign Countries.

The National Telephone Supply Company

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Canadian Mfr.—N. SLATER CO., LTD., HAMILTON, ONT., CANADA

Export Distributor—INTERNATIONAL STANDARD ELECTRIC CORP., NEW YORK, N. Y.

THE NATIONAL TELEPHONE SUPPLY COMPANY

PROJECT SERVICES . . .
SPEED STATION CONSTRUCTION

NEW DELTA STATION, 210,000-kw addition to MP&L's system, demonstrates progressive thinking by one of America's enterprising electric utilities.

Mississippi Power & Light adds 210,000 kw to system with all G-E Delta steam plant

Helping to meet the unprecedented demand for electric power in the South, Mississippi Power & Light's new Delta steam-electric station is now supplying 210,000 kw. The new plant, largest ever built in Mississippi, reflects progressive thinking and advance system planning.

Electrical apparatus was supplied by General Electric, after selection by MP&L and Ebasco Services, the consulting engineers. A G-E project team, composed of Sales, Engineering, and Product specialists assigned to the project, gave valuable assistance in putting the station on the line.

Efficient coordination of design, production and shipment of all electric apparatus by this G-E team proved a significant factor in helping Ebasco virtually eliminate overtime and keep the total cost to MP&L within budget levels.

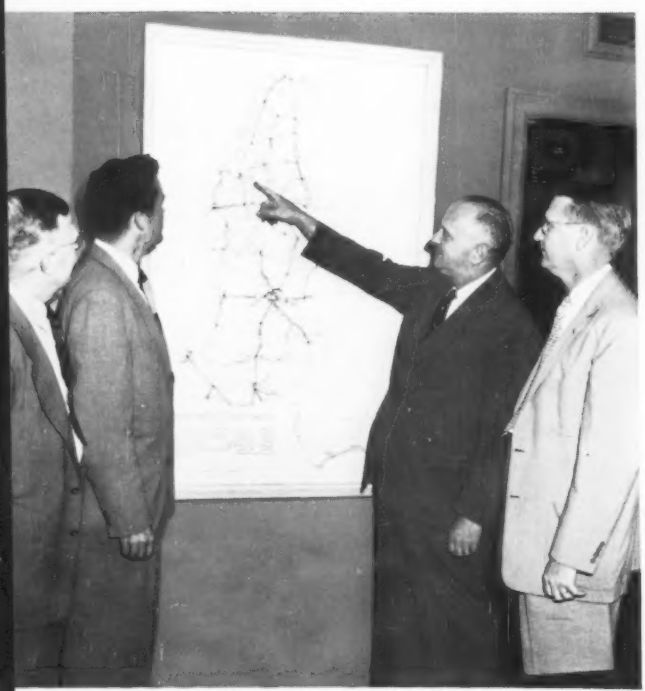
GENERAL ELECTRIC

For More Station Data See Next Page ▶

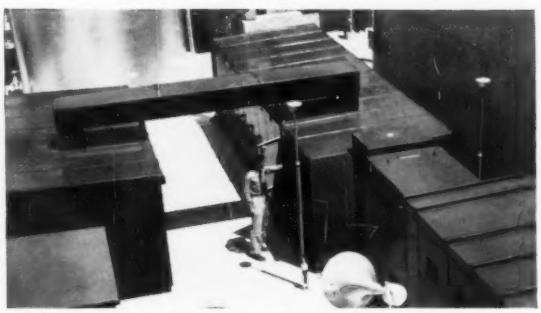
PROJECT SERVICES REPORT

ON THE LINE ahead of schedule, two 105,000-kw General Electric turbine-generators at the new Delta plant are helping meet state's growing need for electric power. Careful planning from the outset meant on-time manufacture, delivery, installation of all apparatus including the G.E.-equipped switchyard with power transformer and auxiliary power supply transformer shown here.

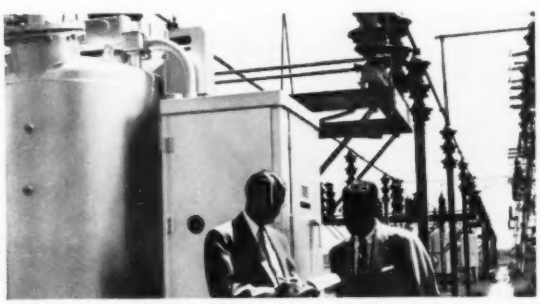
G-E engineers team with Ebasco to meet



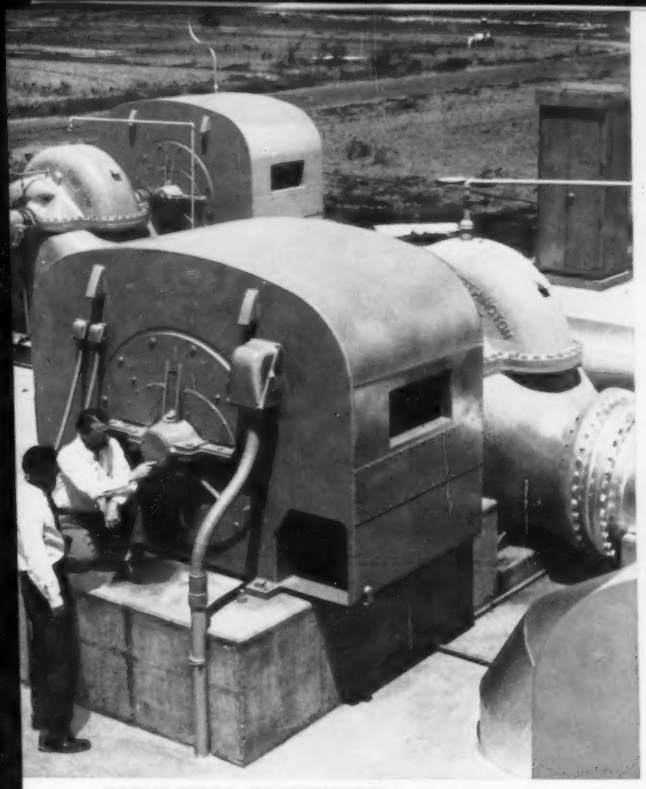
LATEST THINKING in station design highlights new Delta plant discussed here by (l to r) B. M. Davis, MP&L; R. H. Annin, G.E.; R. B. Wilson, MP&L President; T. R. Brock, G.E.



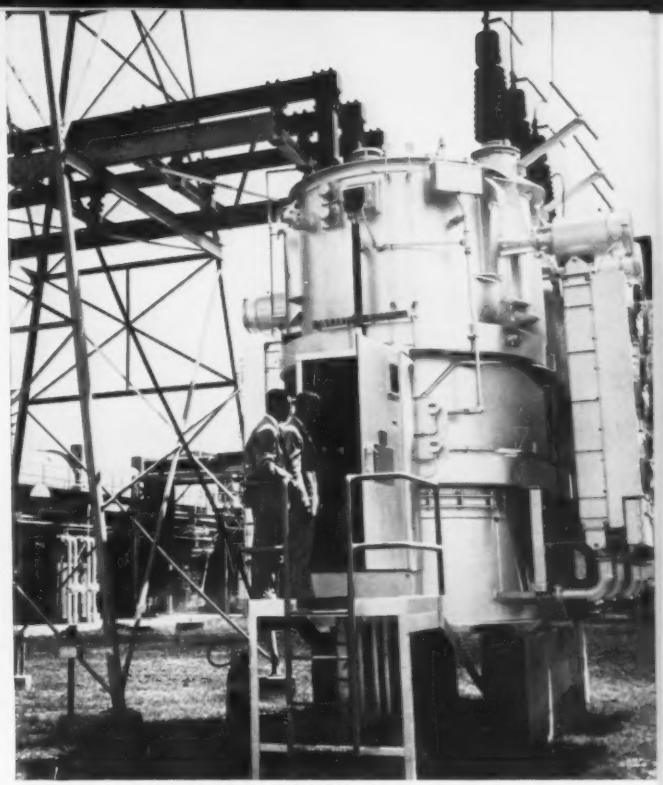
WEATHER-PROTECTED UNIT SUBSTATION with 480-volt duplex switchgear, which serves one of the two 105,000-kw turbine-generators, was designed to meet the needs of the Delta Station.



COMPLETE SWITCHYARDS including switchgear can be provided through G-E Project Services. T. R. Brock, G.E. and J. B. Fountain, MP&L discuss arrangement and design.



ECONOMICAL CONSTRUCTION of G-E weather-protected motors makes them excellent drives for these pumps. Here, design is checked by G.E.'s T. R. Brock and MP&L's D. C. Lutken.



135,000-KVA G-E POWER TRANSFORMER was shipped upright requiring field assembly of accessories only. Here, W. M. Prall, G.E., and J. B. Fountain, MP&L, inspect control accessories.

slated start-up date for new MP&L station

Application, design, manufacture, shipment of apparatus . . . all synchronized with plant's progress . . . eliminated costly delays

When Mississippi Power & Light and its consulting engineers, Ebasco Services, specified General Electric equipment for the Delta Station, a well-organized G-E engineering team went into action. As a result, valuable assistance helped speed construction and get the plant in full-time operation.

Recognizing the importance of early engineering decisions, G.E. aided Ebasco in finalizing the design characteristics of each item of G-E electric apparatus. Based on these decisions, G-E engineers were able to schedule manufacture, coordinate shipment; and thus assure delivery at plant site precisely as needed. Further aid was given in supervision of equipment installation. This efficient teamwork helped place Mississippi's largest single industrial project in operation on schedule and helped keep the total cost within the scope of MP&L's sound financial planning.

Similar teamwork, combining the utility, its consulting engineer and the G-E team of sales engineer, product specialists, application engineers, order service co-ordinators, and field service engineers can also save you time, money and man-hours. Here's how it's done:

Simplify ordering of equipment, purchased either directly, or through your consulting engineers, or through a machinery manufacturer.

Conserve engineering time by handling electrical details which frees you and your consulting engineer for other urgent problems.

Integrate equipment design to assure the maximum flexibility and effectiveness of plant operation.

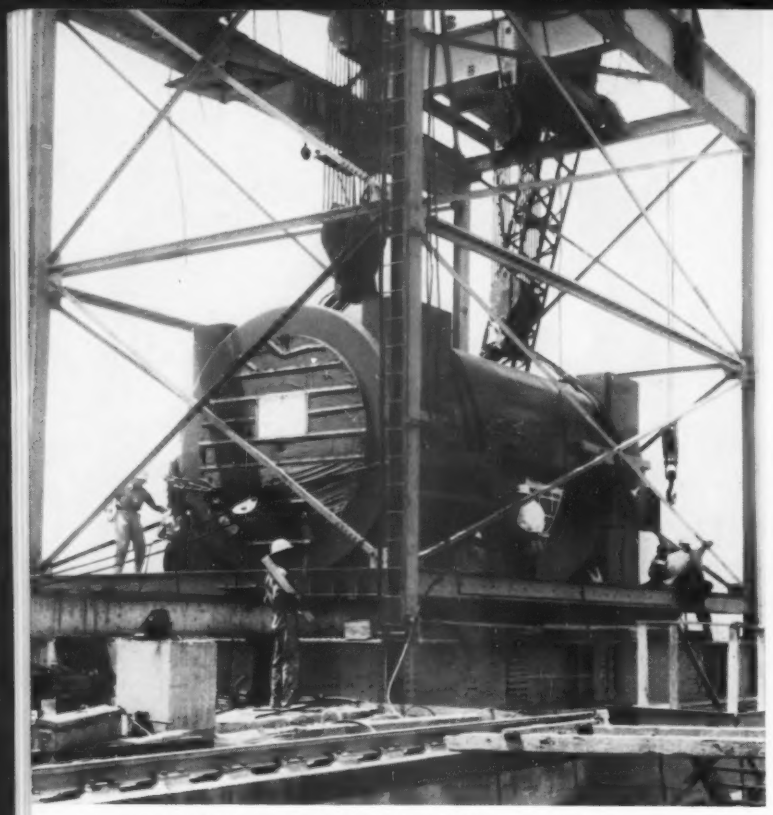
Speed construction by scheduling the arrival of equipment for maximum installation efficiency.

Assist in installation and in training operators to assure minimum start-up time and better understanding of the full operating capabilities of the equipment.

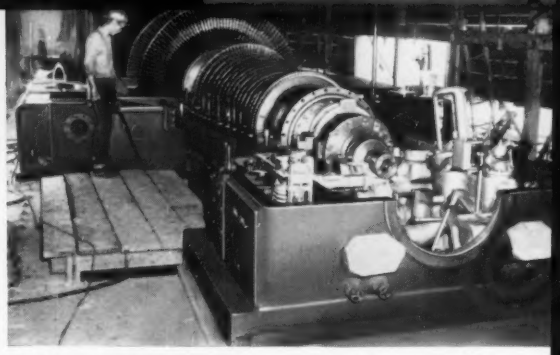
For details contact your G-E Apparatus Sales Representative, or write to Section 302-8, General Electric Company, Schenectady 5, N. Y.

More Power to America

GENERAL ELECTRIC



POSITIONING OF TURBINE-GENERATOR, by the field service engineer assigned to your station, is one of many "follow-through" advantages gained through the use of General Electric Project Services.



CAREFUL SUPERVISION of installation of the rotor in this 105,000-kw G-E unit at the Delta Station was aided by a field service engineer member of a G-E Project team.

CHECKING PERFORMANCE on-the-line is a G-E field service engineer activity that you can obtain through Project Services.

Another "follow-through" of G-E Project Services . . .

G-E field service engineers will supervise installation and start-up of your apparatus

When G-E equipment has reached your plant site, a G-E field service engineer is on the job to help oversee the placement, connection, and start-up of your apparatus investment. As a result, all the individual components of your new station or expanded plant are closely integrated with your over-all system for the best possible operation—as the G-E application engineer intended.

Field Service Engineering is just one of many Project Services on your job when you or your consultant specified G-E equipment. You can take advantage of all these services with G.E.:

Application engineering helps assure that all the items of electrical equipment are coordinated in design and operation.

Product development means you get equipment that incorporates latest design features.

Field service engineering means supervised installation, planned start-up, proper operation of equipment.

Service engineering helps keep plant operating at full capability, means training of operators, setting up of maintenance programs.

Project coordination helps assure proper selection, design, manufacture, delivery of your equipment without costly delays at installation time.

More Power to America

GENERAL ELECTRIC

DRIVER-HARRIS

salutes a great engineering achievement

CUTLER-HAMMER

Eutectic Overload Protection

Cutler-Hammer engineers made history with their eutectic alloy type overload relay for electric motor protection. Virtually all leading manufacturers of motor control today offer this type of overload protection. And more than 25 million electric motors in daily use bear witness to the acceptability and dependability of this proven protection.

Driver-Harris salutes this Cutler-Hammer achievement. The Cutler-Hammer Eutectic Overload Relay shows the dependability of certain alloys in practical use. In the Cutler-Hammer Relay, both the eutectic element which must function so precisely and the heater element which causes it to function are alloys. We are proud that Driver-Harris Nichrome is the resistance alloy used in the heater element of millions and millions of these successful overload relays.

It is not surprising that Driver-Harris alloys are selected by so many leaders of American industry. Driver-Harris alloys are the product of manufacturing methods employing the most precise metallurgical checks and quality controls. Nichrome*V and Nichrome* have long been accepted as the standard by which all electrical resistance alloys are measured. And these are only two of the 112 special purpose alloys developed by Driver-Harris since 1899 for electrical heating, resistance, and electronic applications. Do you need a special alloy? Send us your specifications.

*T.M. Reg. U. S. Pat. Off.

Why Eutectic Alloy Overload Relays Stay Accurate

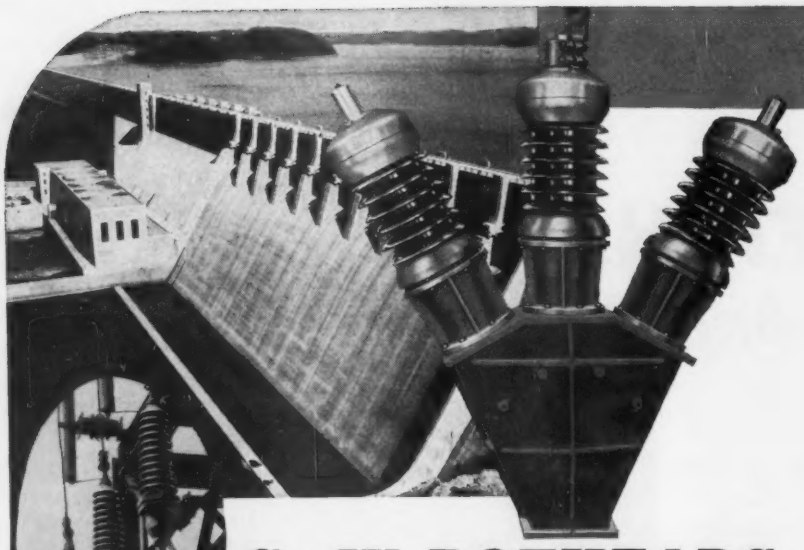
Basic in any overload relay is the need of having a disconnect mechanism respond to dangerous heating of the motor windings. All such relays use heater coils in series with the windings to provide the danger signal within the control unit. In the millions of overload relays using eutectic alloy elements to respond to the increased heating, disconnect occurs when the alloy melts. As this alloy has one definite melting point, the overload relay must always be accurate, regardless of how often or how infrequently it operates.

Sole producers of Nichrome V and Nichrome

Driver-Harris COMPANY HARRISON, NEW JERSEY

Western Representative: ANGUS-CAMPBELL, INC. • 4417 S. Soto St., Los Angeles, 58 • 917 Bryant St., San Francisco, 3

MAKERS OF THE MOST COMPLETE LINE OF ELECTRIC HEATING, RESISTANCE, AND ELECTRONIC ALLOYS IN THE WORLD

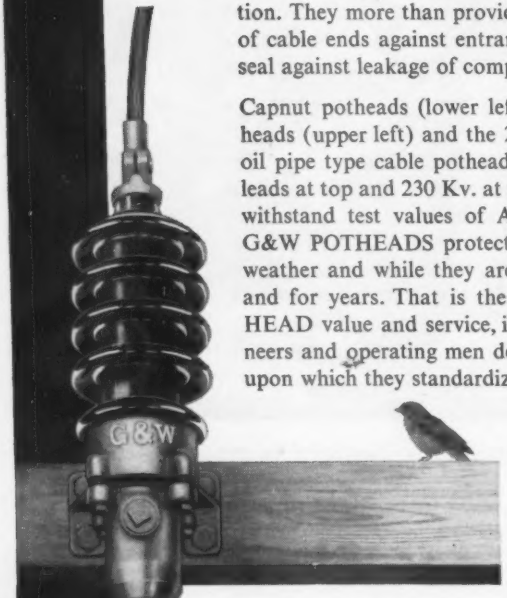


G&W POTHEADS

WEBSTER—*Pothead (pot-hed) n. Elec.—a form of terminal hermetically sealed to the sheath of an electric cable for making a moisture-proof connection between the wires within the cable and those outside.*

G&W POTHEADS more than meet Webster's definition. They more than provide positive hermetic sealing of cable ends against entrance of moisture. They also seal against leakage of compound and cable oil.

Capnut potheads (lower left), soldered porcelain potheads (upper left) and the 200 pounds per square inch oil pipe type cable potheads (26 Kv. 3 pole generator leads at top and 230 Kv. at right) fully meet the voltage withstand test values of A.I.E.E. Standards No. 48. G&W POTHEADS protect cable ends not just in fair weather and while they are new—but in all weathers and for years. That is the definition of G&W POTHEAD value and service, it is also why so many engineers and operating men define G&W as the potheads upon which they standardize.



Send for publications on potheads—

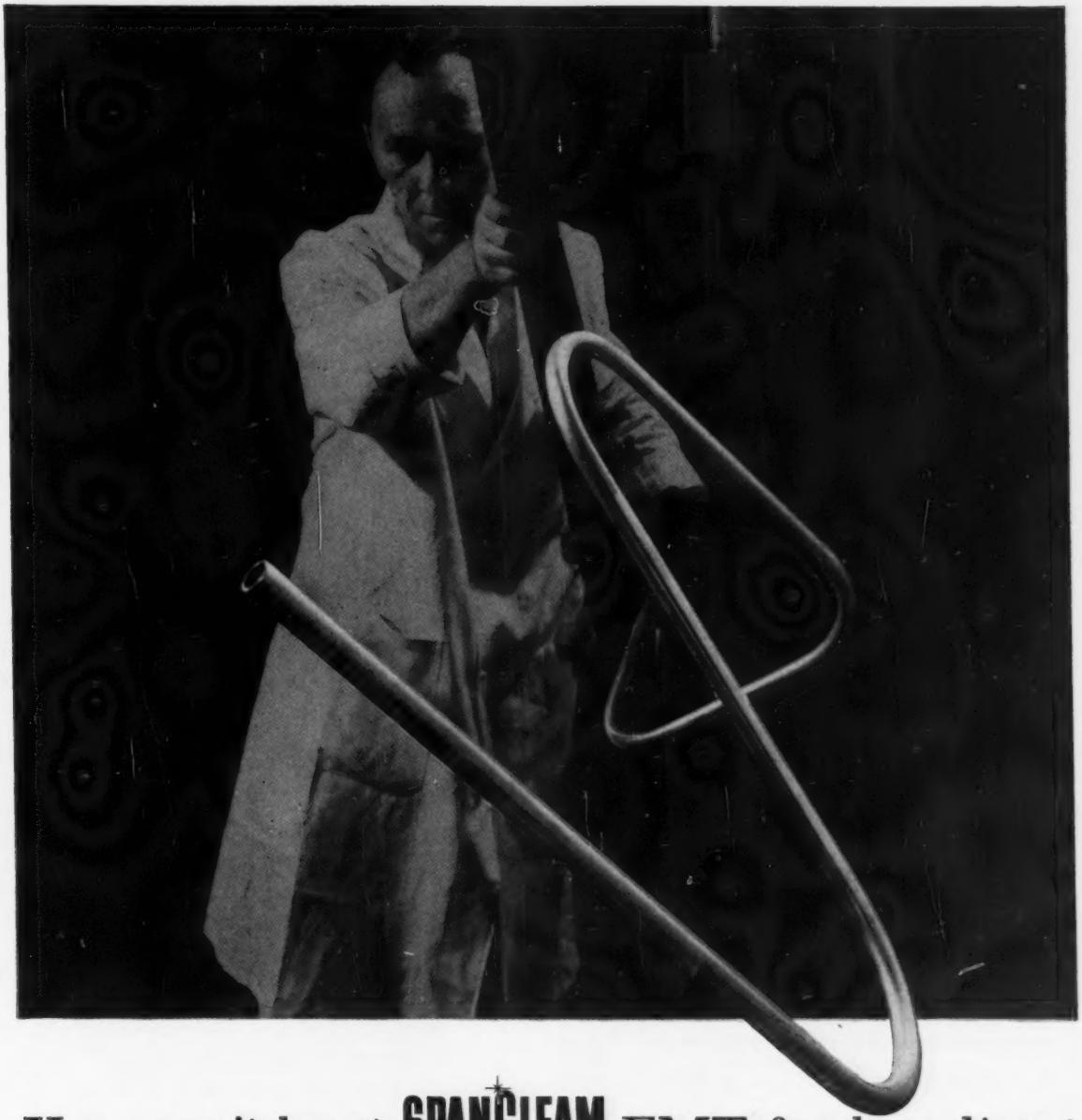
Bul. AA50—"Sodertite"
Bul. AB51—"Capnut"
Bul. AB-D—"Instal. Instr."
Bul. AP55—"Principles"

G & W ELECTRIC SPECIALTY CO.
7780 Dante Avenue, Chicago 19, Illinois, U.S.A.

Representatives in principal cities of U.S.A.
Also made in Canada by Powerlite Devices, Ltd., Toronto, Montreal & Vancouver.

A562

G&W CABLE TERMINATING, CONNECTING, FUSING, SWITCHING DEVICES



You can't beat SPANGLEAM EMT for bending!

You have to see it in action to believe the workout that SPANGLEAM EMT samples get from SPANG'S *quality-control* inspection crew!

A length pulled from each lot of SPANGLEAM is bent like a pretzel to assure you that the continuous weld and the SPANGLEAM finish will stand up under the severest bends you would ever need on any installation.

Then, just to make sure, the thin-wall conduit is bent double, twisted and practically destroyed to see how long the weld and the finish will last under this abuse. Any premature breakdown of the finish or weld means the whole lot is discarded . . . a rare occurrence at SPANG!

SPANG'S inspection team is on *your* side, representing you in the mill to be sure you get a *top-quality* product every time. That's why the SPANGLEAM EMT you use on the job is so easy to work with. *Quality-control* manufacturing processes produce uniform wall thicknesses . . . the weld is strong, smooth and uniform . . . the finish does not crack, chip, blister or peel.

You'll find the same care practiced on SPANG HD and SPANG Black, too. So, buy *top-quality* conduit . . . buy SPANG for easier, faster, better installations. Your local SPANG Distributor carries the complete SPANG line. See him for *top-quality* SPANG Conduit. He will give you *top-quality* service, too.

SPANG CONDUIT

SPANG-CHALFANT
Division of The National Supply Company
GENERAL SALES OFFICE:
TWO GATEWAY CENTER, PITTSBURGH, PA.
District Offices and Sales Representatives in Principal Cities

Will this blot spread... or shrink?

NOTHING STRIKES so brutally at human lives as a slum.

Yet of America's many millions of homes, the blot that is a slum covers more than 1 out of every 10 . . . and nearly one-half of all our homes are urgently in need of repair and basic improvements.

Will the blot go on spreading? Or will a concerted, nationwide attack on the causes of slums shrink it, year by year, until it is wiped out? Today, this is a challenge to every American . . . a challenge that *must* be met.

Your community . . . your problem!

A slum reaches across blocks, across miles, to sit on your doorstep and demand a price.

You pay it in the threat of crime and juvenile delinquency to your family. You pay the price in higher personal property taxes to fight the disease and crime and poverty that are slum-bred. You pay personally when the value of your home sinks as community deterioration takes another step closer.

Your *firm* pays when the community where you do business goes downhill. Slums automatically mean lower purchasing power and less effective labor.

Good citizenship is good business

It's good citizenship and good business both for your firm to join efforts to check housing decay . . . to stop slums before they start. In fact, it's the *responsibility* of every business, as it is of every other good citizen, to support community improvement efforts.

Some slums are beyond repair. They should be torn down and a fresh start made. Others can be remodeled, made to conform to better living standards. So it is up to you to get behind every sound program which seeks to provide adequate housing for all our people.

Adding your support to the efforts of the millions already attacking the problem, your firm can help stop slums cold and put America's housing standards at a new height.

How to get into action

A group of Americans from every walk of life has formed a new, non-profit organization to help combat home and community deterioration — The American Council To Improve Our Neighborhoods . . . A.C.T.I.O.N.

Send for a free copy of "ACTION." It explains what A.C.T.I.O.N. is and proposes to do. It also lists booklets, research reports, check-lists, and other material which can help you protect the housing health of your community. Address P. O. Box 500, Radio City Station, New York 20, N. Y.

ACTION

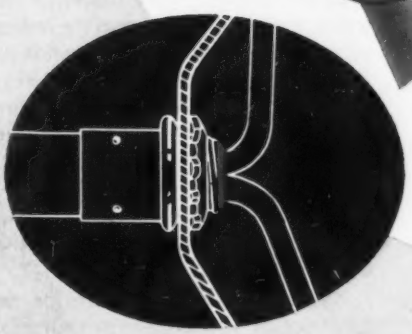
American Council To Improve Our Neighborhoods

Red Throat

B-M 21B, THE NEW INSULATED THROAT INDENTER CONNECTOR FOR E.M.T.

Four Ways Finer

1. Protruding rounded red plastic lip of bushing prevents cutting of insulation—eliminates shorts.
2. Full thread screws into all conduit fittings. Lip of RED THROAT bushing protects thread from damage.
3. Deep dished eight pronged lock nut is easier to drive on—screws flush to shoulder and digs into metal of box for vibration proof positive ground.
4. Permanent locked-in bushing insures smooth burr-free raceway for easy fishing. No extra work and costs no more.



Briegel, the Original Indenter Fittings are neater in appearance, easier and faster to use. Installation is simple and less expensive. Two quick squeezes sets them forever. Try B-M Indenter Fittings and get more profits from each job!

ALL BRIEGEL FITTINGS ARE U. L. APPROVED AS CONCRETE-TIGHT

Order From Your Wholesaler!

All B-M Indenter Fittings are U.L. Approved as concrete-tight and for general use (File Card E10863). Also comply With Federal Specifications W-F-406.

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TELESCOPE BM SYSTEM

BRIEGEL METHOD TOOL CO.

GALVA • ILLINOIS

Warehouse Stocks in Principal Cities for Immediate Delivery!

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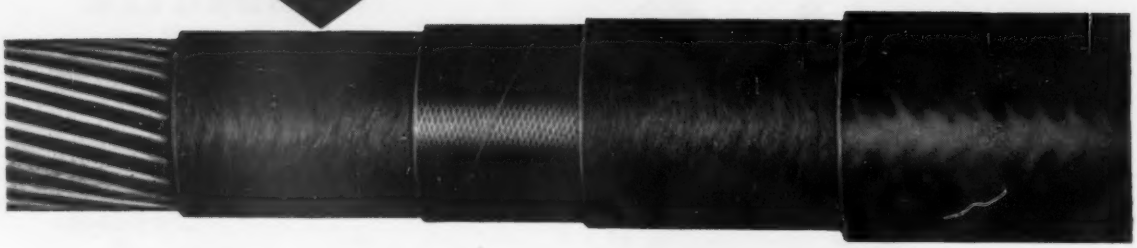
Look beneath the braid

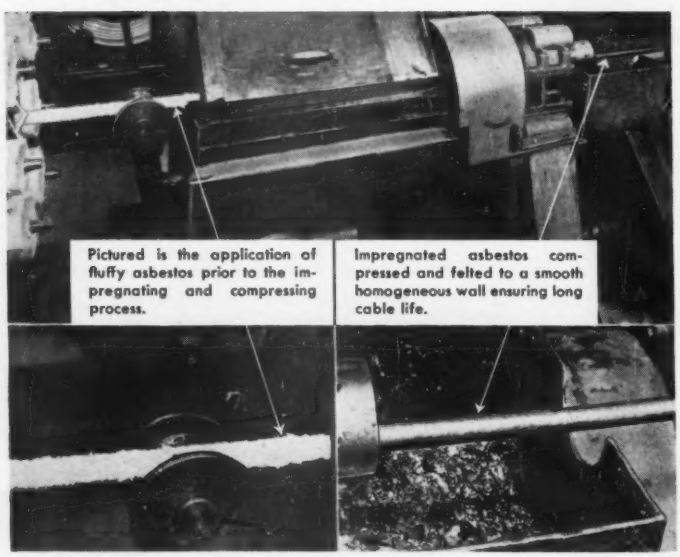
. . . that's where quality begins



these service proved felted asbestos walls insure uninterrupted operation with

ROCKBESTOS A. V. C.®

(N.E.C. Type AVA)



Pictured is the application of fluffy asbestos prior to the impregnating and compressing process.

Impregnated asbestos compressed and felted to a smooth homogeneous wall ensuring long cable life.

There's a reason why Rockbestos A.V.C. (N.E.C. Type AVA) gives such outstanding service in industry. It is the uniform, dense, felted asbestos walls which have been thoroughly impregnated with selected compounds and firmly compressed without laps, seams or joints to make them resistant to heat and moisture. Felted asbestos walls seal the varnished cambric tapes away from heat and moisture . . . keep dielectric strength high . . . add strength and protection against damage from flexing.

Because of felted asbestos wall construction you benefit with trouble-free, uninterrupted service under conditions such as high ambient temperature, overloads, exposure to heat, oil, grease, corrosive fumes and exposure to moisture.

Complete construction and test specifications of Rockbestos A.V.C. (N.E.C. Type AVA) are in the new booklet: "Specification RSS-88."

Write for your free copy.

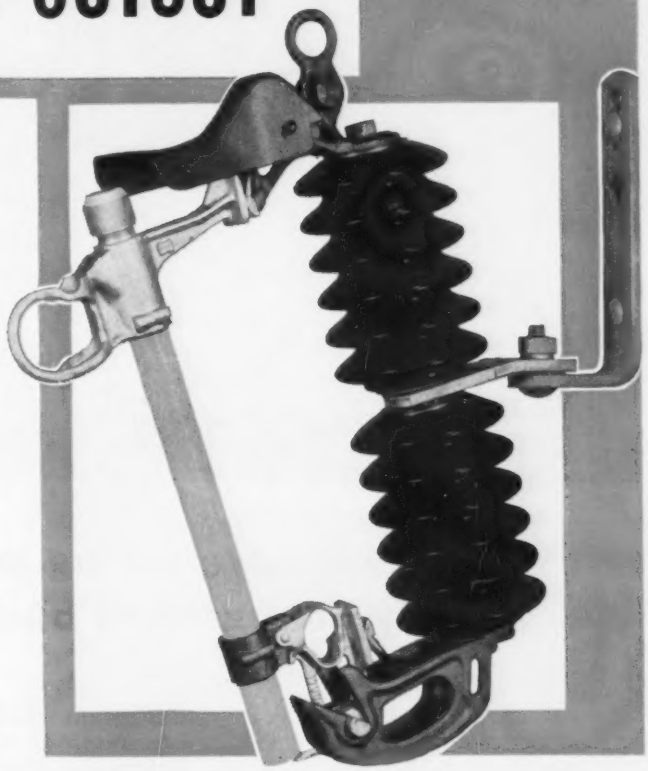
ROCKBESTOS PRODUCTS CORP.
NEW HAVEN 4, CONN.

NEW YORK • CLEVELAND • DETROIT • CHICAGO
PITTSBURGH • ST. LOUIS • LOS ANGELES • NEW ORLEANS
OAKLAND, CALIFORNIA

STOCKED COAST TO COAST
Standard Rockbestos A.V.C. construction (N.E.C. types AVA, AVB, etc.) are available for immediate shipment. Call or write nearest branch office.

HIGHER INTERRUPTING RATINGS! SAME LOW COST!

SOUTHERN STATES NEW TYPE CV-33-F CUTOUT

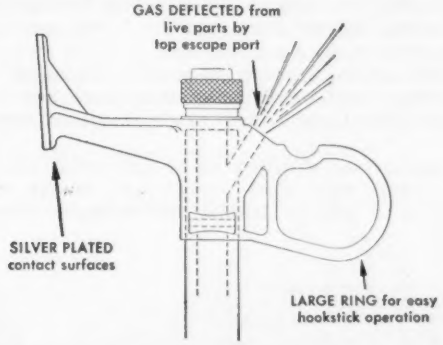


Here is Southern States' answer to stepped up protection for continually increasing system capacities—the new Type CV-33-F control-vented cutout . . . tougher, more versatile than any of its famous predecessors . . . at no increase in price!

Install the Type CV-33-F today with full assurance that it will take in stride the heavier faults sure to come in the years ahead. Build a new margin of safety into your system which will mean substantial savings over the years!

The Type CV-33-F functions dependably in all ranges of cutout operation . . . from restricted faults to those of high magnitude. It is a simple, sturdy unit. Nothing to go wrong or get misplaced. No spare parts necessary to put it back into operation—only a conventional universal button-head link.

Specify Southern States Type CV-33-F Cutouts and get extra protection without extra cost.


GAS DEFLECTED from live parts by top escape port
SILVER PLATED contact surfaces
LARGE RING for easy hookstick operation

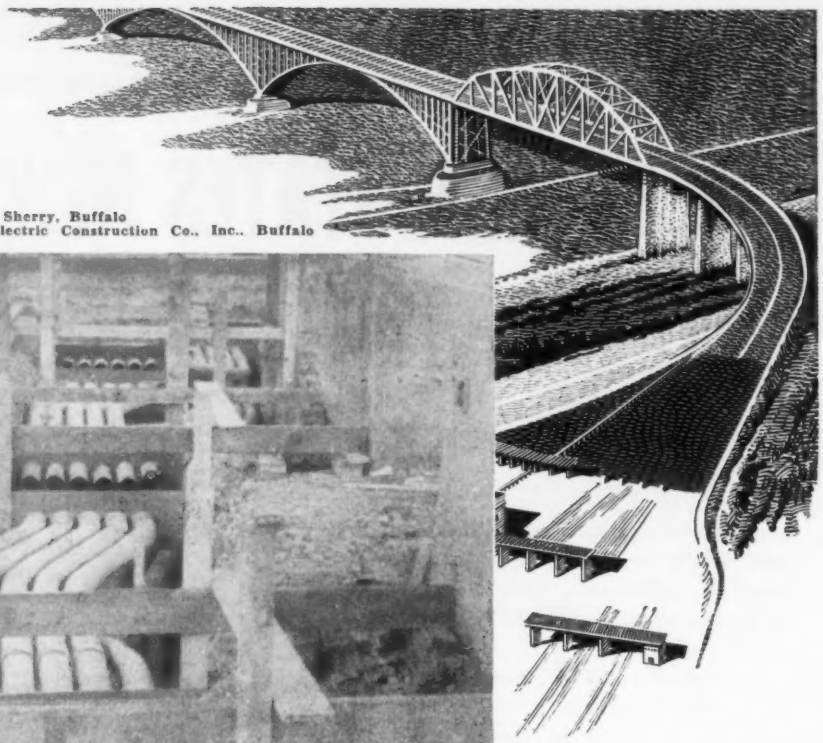
Check These Interrupting Ratings Available at No Increase in Price

TYPE CV-33-F			TYPE CV-33-FH		
KV	CONT. CURRENT	RMS AMPS INT. CAPACITY	KV	CONT. CURRENT	RMS AMPS INT. CAPACITY
5	100	6,000	5	100	8,000
			5	200	8,000
7.5	100	6,000	7.5	100	8,000
			7.5	200	8,000
15	100	4,000	15	100	6,000
25	100	2,000	15	200	6,000

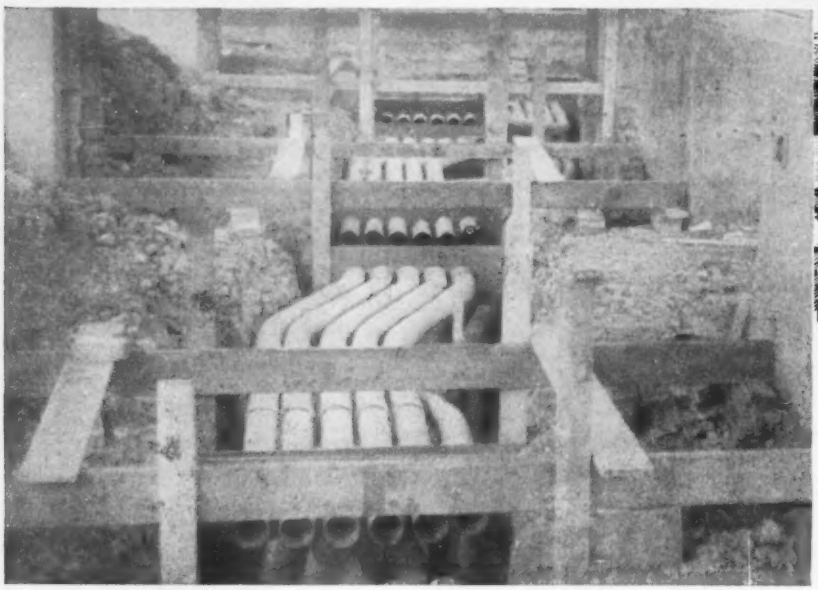
NOTE. ALL STATIONARY CONTACTS ARE RATED 200 AMPS

SOUTHERN STATES EQUIPMENT CORP.
HAMPTON, GEORGIA

IN CANADA: Dominion Cutout Co., Ltd., Toronto



ARCHITECT—Earl Martin, Buffalo
CONSULTING ENGINEER—Walter H. Sherry, Buffalo
ELECTRICAL CONTRACTOR—Frey Electric Construction Co., Inc., Buffalo



Peace Bridge wiring securely guarded by Youngstown Buckeye Conduit

QUALITY YOUNGSTOWN SERVICE

WHY BUCKEYE IS BETTER

Youngstown is the one manufacturer who makes rigid steel conduit from ore to finished product. This enables Youngstown to control the complete manufacturing process—insurance that each length of "Buckeye" is made of top-grade steel.

Underground wiring at the Peace Bridge in Buffalo will always be safe. Permanent protection was insured by installing Youngstown Buckeye rigid steel conduit for the wiring systems of the new and vastly improved approaches on the American side.

Vital traffic controls and lighting systems can operate dependably in handling the ever-growing traffic over this greatest trade link between the United States and Canada—now nearly 4 million motor vehicles a year.

Wherever electrical wiring must function safely and efficiently in hazardous locations, install rigid steel conduit—and always use Youngstown Buckeye. It is sold by leading distributors in every industrial market.

Youngstown BUCKEYE CONDUIT

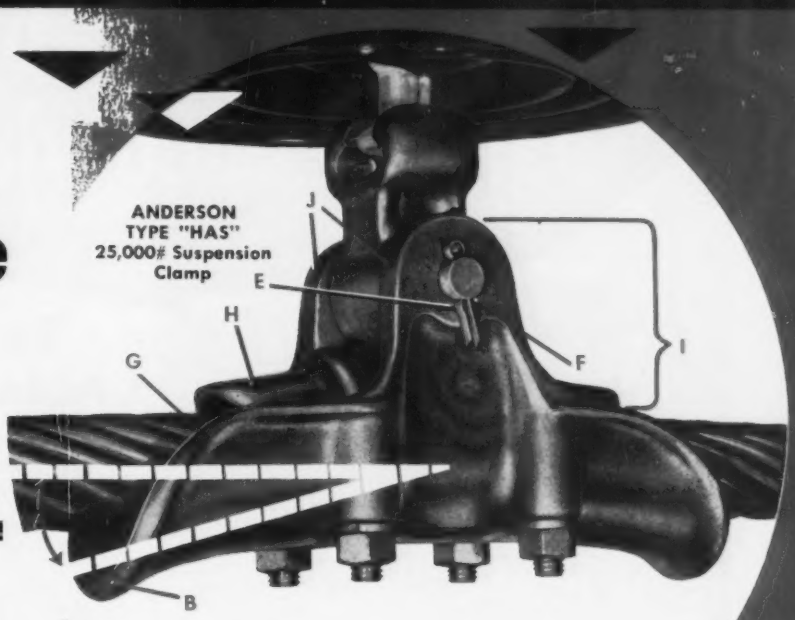
THE YOUNGSTOWN SHEET AND TUBE COMPANY *Manufacturers of Carbon, Alloy and Yoloy Steel*

General Offices Youngstown, Ohio District Sales Offices in Principal Cities.

SHEETS - STRIP - PLATES - STANDARD PIPE - LINE PIPE - OIL COUNTRY TUBULAR GOODS - CONDUIT AND EMT - MECHANICAL TUBING - COLD FINISHED BARS - HOT ROLLED BARS - WIRE - HOT ROLLED RODS - COKE TIN PLATE - ELECTROLYTIC TIN PLATE - BLACK PLATE - RAILROAD TRACK SPIKES - MINE ROOF BOLTS

New SUSPENSION CLAMP

...the result of a nation-wide utilities survey



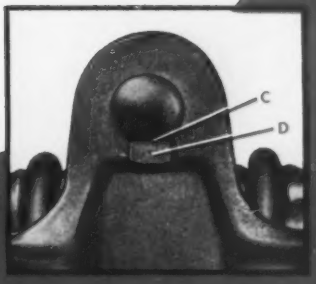
POWER LOSS PRACTICALLY ELIMINATED!

Deep, flared cable groove at mouth with extra built-in strength provides for *dual use* . . . suspension as well as angle pull-off! Turning angles on all sizes permit widest range of conductor sags. Light weight to reduce conductor damage.

HAS*. . . TYPE AND SIZES

Catalog Number	Min. Groove Diameter	Max. Groove Diameter	Ultimate Strength in Lbs.
HAS-85-S	.40	.85	17,000
HAS-104-S	.50	1.04	25,000
HAS-118-S	.70	1.18	25,000
HAS-129-S	.90	1.29	25,000
HAS-139-S	.90	1.39	25,000
HAS-147-S	1.00	1.47	25,000
HAS-162-S	1.10	1.62	25,000
HAS-182-S	1.25	1.82	25,000
HAS-204-S	1.40	2.04	25,000
HAS-227-S	1.75	2.27	25,000
HAS-252-S	2.00	2.52	25,000
HAS-252-16S	2.00	2.52	30,000

*Available through insulator manufacturers



Note carefully the specific features engineered into these newly developed Anderson Suspension Clamps:

(A) Correct conductor approach angle with keeper and bottom of groove . . . prevents crystallizing damage due to conductor vibration.
(B) Shape of mouth flare provides proper approach angle with the sides of clamp . . . for wide range of sagging tensions.
(C) & (D) Anti-rotation lug, with seat . . . prevents wear in the aluminum clamp ears.
(E) & (F) "Humped" speed cotter key remains tight in clevis pin hole . . . preventing wear and reducing Radio and TV interference.
(G) Minimum clearance between conductor and clamp . . . increases protection of conductor.
(H) Non-ferrous keeper . . . prevents electrolysis and further reduces power loss.
(I) Short clamp ears . . . reduce overall assembly length and allow damaging vibration to pass through.
(J) Heavy ear section.

Industrial Engin. & Equip. Corp.
417 S. Hill St. — Michigan 7794
Los Angeles 13, California

Waltham, DeWitt & Krusi
632 Monadnock Bldg. — GArfield 1-5054
San Francisco 5, California

Hamilton Associates
1236 Elati Street — CHerry 4-1505
Denver 4, Colorado

Clarence W. Silver Company
500 West 7th So. — Elgin 5-5378
Salt Lake City 4, Utah

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Seattle 44, Washington

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ANDERSON BRASS WORKS, INC.

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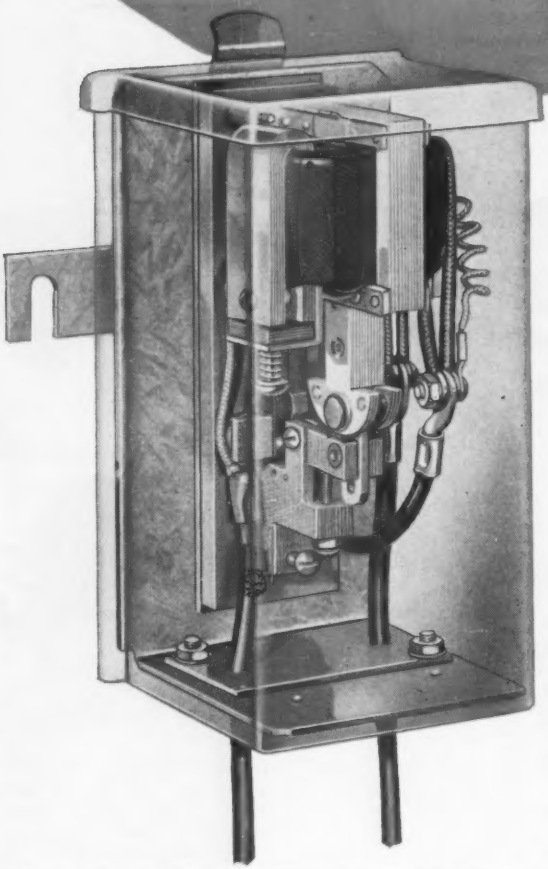
Take full advantage of banked secondaries...



Restore service Automatically with

KEARNEY

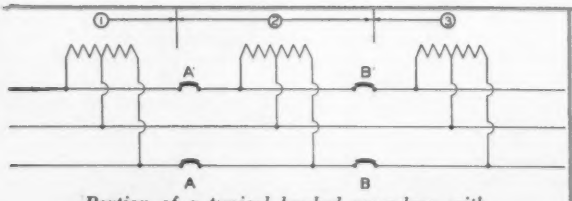
Secondary

CIRCUIT BREAKERS

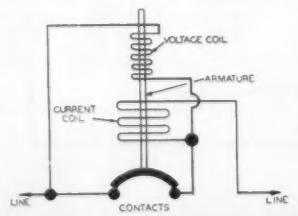
The fundamental advantage of banking transformers on a secondary is to distribute the load over several small units rather than force each transformer to handle the load in its immediate location.

Kearney Secondary Circuit Breakers make secondary banking practical and profitable. They are normally installed at points of minimum current interchange between transformers. When a fault occurs in one section, adjacent breakers open to protect unfaulted sections. When the fault clears itself, the breakers automatically reclose and restore service. On permanent faults, the breakers remain open, isolating the faulted section to prevent cascading of the outage to unaffected circuits.

Write today for descriptive information.



Portion of a typical banked secondary with sectionalizing breakers AA' and BB' installed



Internal wiring details of the breaker showing potential and current coils

JRK 282W

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JAMES R. KEARNEY CORPORATION ST. LOUIS, MO. GUELPH, ONT.

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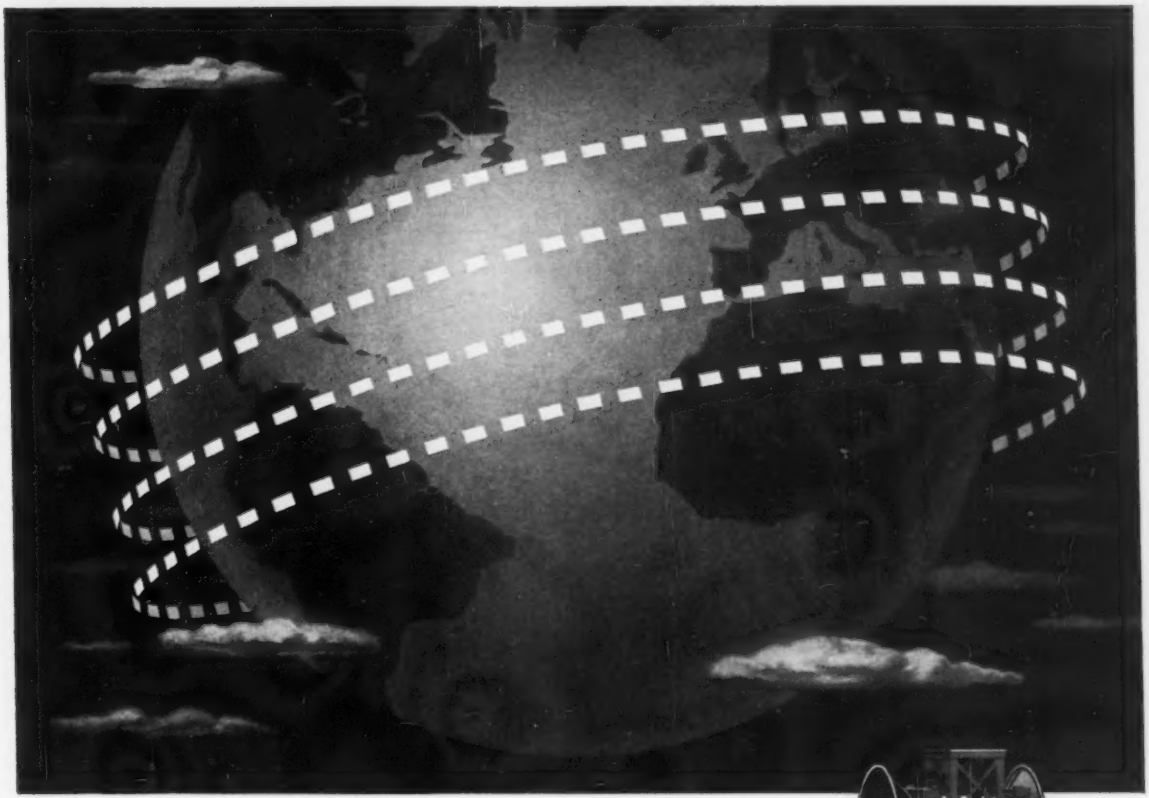

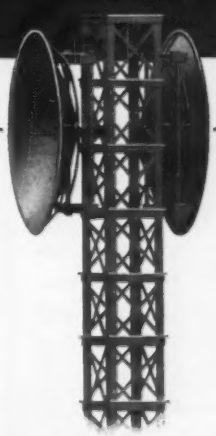

100,000 channel-miles is a lot of microwave experience

In 17 countries today... from Canada to Africa... from Sweden to Australia... multichannel microwave systems designed, manufactured, and installed by companies of International Telephone and Telegraph Corporation are serving government and industry... providing reliable communication over great distances... under all conceivable conditions of weather and terrain.

Consisting of links and networks, these vast and, for the most part, invisible communication facilities represent over 100,000 channel-miles, or more than four times the earth's equatorial circumference.

In this country alone, *Federal* Microwave provides tens of thousands of channel-miles... operated by pipelines, power utilities, telephone companies, municipalities, administrations, TV stations and others.

Designing and building multichannel microwave systems to meet the specialized circuitry requirements of such a wide variety of operations calls for experience... for engineering and manufacturing skill that has its roots in the pioneering days of microwave... for know-how that's *"Certified by a World of Research!"*

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The Ohio carbon brush has that distinction of performance which is quickly revealed in use.

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LETTERS TO THE EDITOR

Should Be Defined

To the Editor:

An editorial in ELECTRICAL WEST for August states the cost estimate of 3.28 to 4.52 mills per kwh obtainable from large size thermal units is an inducement to install steam generation to firm up secondary hydro power.

Would you please advise me of the basis for this cost estimate and if it is an estimate of production cost. If it is production cost, is it the direct production expense only, such as operation, maintenance, fuel, etc., in accordance with FPC uniform system of accounts or does it include its share of taxes, interest charges on debt or other return charges and general administrative expenses also?

To be technically useful and meaningful, it appears that "cost" should be properly qualified.

C. F. DAVIS, E. E.
New York, N. Y.

Editor's Note: Reader Davis is correct. Cost figures relating to electric power should be properly defined. In this case direct production expenses (fuel, operation and maintenance) were included in the 3.28 to 4.52 mill "cost." Newest large thermal units produce power at an over-all cost of 5 to 6 mills per kwh, with a plant capacity factor of 60%, depending upon the price of fuel.

Wants Regional Planning

To the Editor:

I have read your editorials in ELECTRICAL WEST over the past three years concerning the controversies which have arisen in regard to power development in the Pacific Northwest. I heartily disagree with what you feel to be the proper and satisfactory solution to these controversies and I would like to express to you what I feel is the only positive and constructive way out of the mess which has developed. . .

I believe that the very size, complexity and importance of the task of proper Columbia Basin development requires comprehensive regional planning by an agency or combination of agencies which make use of all of the available information from previous regional resource studies and of the facts of past and present development in outlining a continued development program. . .

I believe that engineers are potentially the best qualified group to ascertain and assemble these facts of regional development for presentation to the public. However, at the present time Northwest engineers are sadly lacking in professional unity of purpose and organized action. Without the collective recognition by engineers of their public responsibilities and the potentialities of their unique public service, engineering ceases to be a profession and becomes merely another job in the application of certain skills requiring a technical education. Engineers of the Northwest do have a task of great public responsibility before them in outlining a soundly engineered program for regional development, but for the most part they have failed to recognize their professional obligations. They have merely taken jobs in an area of development which was fought for and given inertia by laymen and politicians with foresight and the courage of their convictions. The efforts of such laymen and politicians are no longer sufficient to promote the proper development of the Columbia Basin in this controversial period. There is an immediate need for engineers to reaffirm the basis for comprehensive regional development by bringing to the attention of the public the facts of engineering and economic feasibility which leave the door open for the efficient and effective maximum development of the Columbia Basin's natural resources in the best public interest. Engineers from all branches of industry in the Northwest are needed to participate in such an undertaking. It is a job which can only be satisfactorily accomplished by engineers. . .

R. J. THOMAS
Spokane, Wash.

Use coupon if: (1) you have a problem; (2) want to ask a question; (3) want to comment on any department in the magazine; (4) have a "gripe."

To The Editor:

_____

_____

_____

_____

_____

_____

NAME ..... ADDRESS .....

COMPANY ..... TITLE .....

Transformer fabrication must be done carefully, with skill . . . to assure proper performance and to prevent damage that might later result in breakdowns.

That's why transformer fabrication requires men with ability . . . and plant capacity. Moloney has both, and for you it means transformers that are dependable . . . because they're properly designed and skillfully fabricated to provide better overall operating performance.

ME88-55

Specify Moloney . . . Get Dependability at its Best . . . All Along the Line

MOLONEY ELECTRIC COMPANY

Power Transformers • Distribution Transformers • Load Tap Changing Transformers
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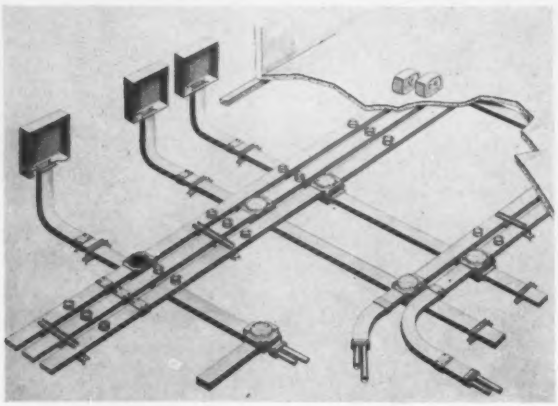
SALES OFFICES IN ALL PRINCIPAL CITIES • FACTORIES AT ST. LOUIS 20, MO. AND TORONTO, ONT., CANADA

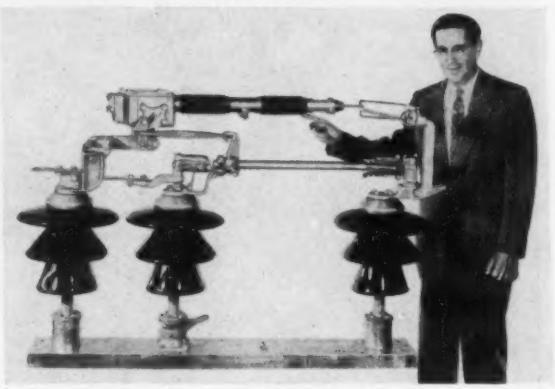
PRODUCT NEWS



Underfloor Wiring System

(1) General Electric Co., Construction Materials Division, Bridgeport 2, Conn.

A new two-level steel underfloor wiring system for commercial, industrial and institutional buildings is announced by this manufacturer. Flexibility in layout is a primary advantage of the system, it is stated. The two-level design provides for complete separation of high and low tension services by the use of single duct junction boxes only, with entrances on two levels.



Outdoor Interrupter Switch

(3) Electrical Engineers Equipment Co., 25th Ave. & Division St., Melrose Park, Ill.

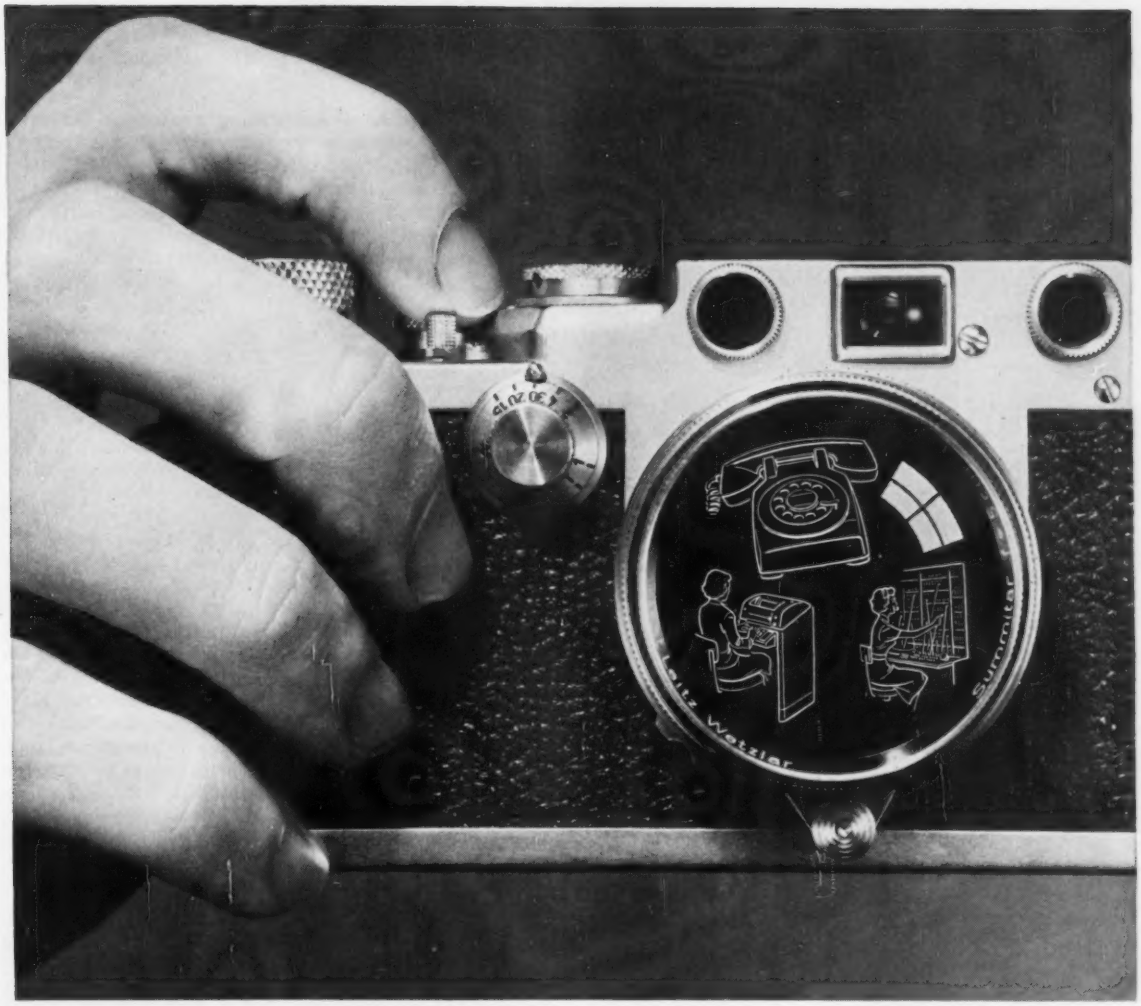
A new outdoor interrupter switch with a high-speed dry-type interrupter unit has been put on the market by this manufacturer. It is said to offer a constant high speed interruption of one cycle or less. The contact speed is independent of the switch's operating time on both opening and closing. Interruption takes place entirely within an arcing chamber where the arc is confined and extinguished by pressure and gases from dry solid material.

Masonry Hand Drill

(2) Molco Drilling Machines Inc., 1100 20th St., N.W., Washington 6, D. C.

A new self-sharpening diamond bit masonry hand drill has been added to this company's line of products. It is a 3,200-rpm hand drill equipped with a special integral water injection system that forces water down the center of the drill bit to act as a cooling agent.

(4) Illinois Electric Porcelain Co., Macomb, Ill., has developed new production equipment for electrical porcelain. Pictured here is semi automatic fettling of pin-type insulators. Line Material Co. engineers designed the equipment so that dimensional requirements will be strictly met. The company reports that the new machines, together with rigid quality control and production testing procedures, assure products of consistent electrical and mechanical qualities. Also added, in the way of new equipment, is a hot press for pin-type insulators with four molds for speed



Do you have a good picture of what Bell System communications can do for you?

Looked at your communications recently? You might be surprised at what has happened as your business has grown—the wrong type of equipment here, not enough of the right kind there.

To make sure your communications are doing a good job for you, why not let the Bell System review them? The result can mean substantial savings in time and money to you, faster and better service for your customers.

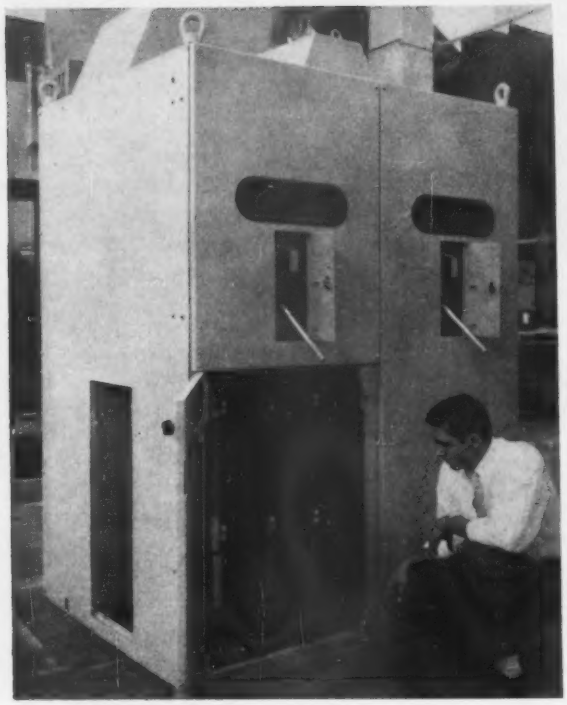
Bell System recommendations are "custom-built" for your particular communication requirements. This is important since no two companies, even in the same industry, do business exactly alike. They differ in size, territory and methods of operation.

•

The Bell System will give you a clear picture of your communications and recommend services for your specific needs. There's no cost or obligation—just call your Bell Telephone representative.

BELL TELEPHONE SYSTEM

TELEPHONE TELETYPEWRITER MOBILE RADIO TELEMETERING AND REMOTE CONTROL CHANNELS



Load Break Switch

(5) Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa.

A new air-insulated load-break switch developed by this company has a rating of 500 operations interrupting 100 amp at 15 kv and a continuous current rating of 600 amp. It also meets the NEMA standard of 40,000 amp momentary and 25,000 amp for four seconds, the manufacturer reports. It is intended for use on 15-kv circuits with a basic insulation level of 95 kv.

Tunnel Light Control

(6) Fisher-Pierce Co. Inc., 84 Pearl St., S. Braintree, Boston 85, Mass.

Automatic turn-on of tunnel entrance lights is accomplished with a new photoelectric control device recently developed. The control has an adjustable turn-on range of 600 to 200 f-c, with factory set turn-on of 500 f-c and turn-off of 400 f-c. The 63309C unit has a high potential rating of 3,000 v and an insulation level of 7,000 v. It is designed for operation on 105-130 v, 50-60 cycle, a-c.

Base and Repeater Radio Stations

(7) Allen B. Du Mont Laboratories Inc., 760 Bloomfield Ave., Clifton, N. J.

Two new 250-w base stations and a repeater station are recent products of this manufacturer. The more powerful base stations and the repeater station extend the ranges of mobile radio and have circuitry that permits expansion if necessary. Full information is available from the Mobile Communications Department of the company at the above address. Ask about base stations MCA-152-A and MCA-352-A; and repeater station MCA-454-A.

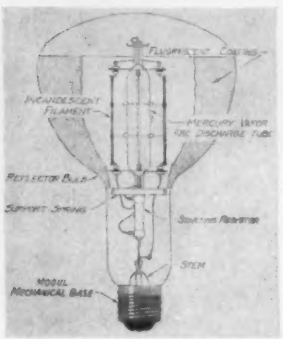
Adjustable Aerial Platform

(8) J. H. Holan Corp., 4100 W. 150th St., Cleveland 11, Ohio

This manufacturer is introducing a platform for aerial ladders that is adjustable to conform with the angle of the boom. At higher angles the workman stands on a floor level in the conventional position. At lower angles the position of the platform is changed so that a different floor level is in use. The platform is an optional feature on all Holan mechanical and hydraulic ladders, and can be installed on models already in use.

New Light Source

(9) Duro-Test Corp., North Bergen, N. J.



The best features of modern incandescent, fluorescent and mercury-vapor lamps are said to be combined in this new type of lamp. It is called Fluomeric. The lamp is said to emit light in three ways: by gaseous discharge as in a quartz mercury-vapor lamp, by fluorescing of activated phosphor powders as in a fluorescent lamp and by tungsten filament as in an incandescent lamp. The lamp can be placed in any household socket and will operate on ordinary current. Durability and a 25% greater efficiency are stated benefits. Rated life is reportedly 12,000 hours.

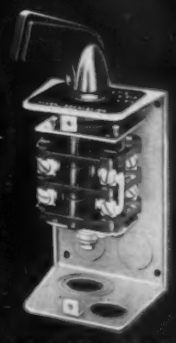
Electric Tailgate

(10) Hi Tender Co., Leavenworth, Wash.

Simplicities of operation and installation are stated features of this manufacturer's new electric tailgate loader for small trucks. It is currently being manufactured to fit the beds of eight standard trucks from ½-ton to 1½-ton sizes. Loader capacities range from 800 lb to 1,200 lb. Operates from truck battery with push-button control on right side of truck bed.

DRUM SWITCHES
with that QUALITY look...
that are QUALITY

Bulletin 350 Style B Master Drum Switch with cover removed to show contacts

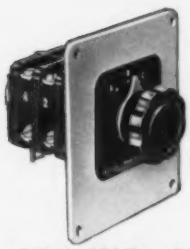


Bulletin 806 Style C Drum Switch for surface mounting

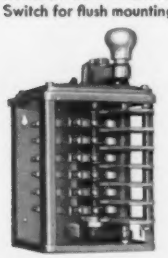
Bulletin 806 Style B Transfer Switch in Type 1 enclosure

Bulletin 350 Drum Switch in Type 4 watertight enclosure

Master Switches • Transfer Switches • Instrument Switches in Various Mountings and Contact Arrangements



Bulletin 806 Transfer Switch for flush mounting.



Bulletin 365 Drum Switch for manual speed control of multispeed a-c motors, with cover removed to show stationary and drum contacts.

Drum switches are sometimes the simplest and lowest cost units for handling sequence control . . . or for monitoring a group of indicating instruments. Often drum switches are the best answer for reversing service or for speed control of variable speed a-c motors.

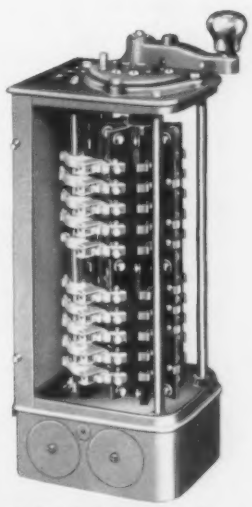
The Allen-Bradley line of drum switches includes such a broad range of types and sizes that practically any requirement can be satisfied. Silver alloy contacts of simple design . . . good contact pressures . . . rugged construction . . . assure long, trouble free life.

Though low in cost, Allen-Bradley drum switches are a QUALITY product. Write for A-B Handy Catalog.

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.
In Canada—Allen-Bradley Canada Ltd., Galt, Ont.

BULLETIN 350 STYLE A REVERSING DRUM SWITCHES

Style A Reversing Drum Switches are designed for across-the-line starting and reversing of small squirrel cage motors. Can be used for single phase motors, and for d-c shunt and compound wound motors. Will handle a-c single phase motors up to 1½ hp, 220 v; polyphase motors up to 2 hp, 220-440-550 v; and d-c motors up to ¼ hp, 115-230 v.



Bulletin 375 Drum Controller for speed control of slip-ring alternating-current motors.

1-56-M

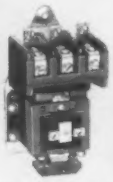
A-B Quality

The Sign of QUALITY Motor Control

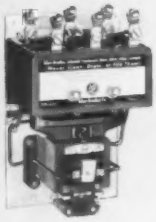
ALLEN-BRADLEY
MOTOR CONTROL
QUALITY

ALLEN-BRADLEY
A-C CONTACTORS

2 pole—Size 00
10 ampere

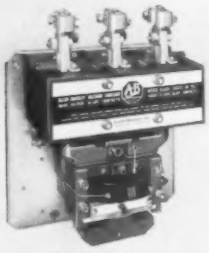


3 pole—Size 1
25 ampere

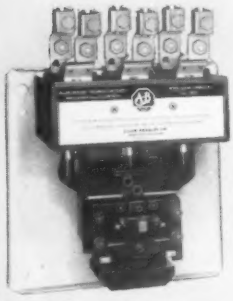


3 pole—Size 2
50 ampere

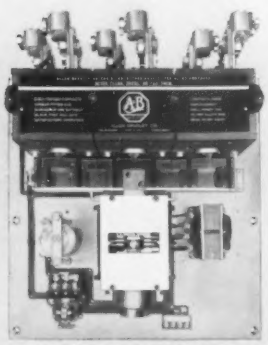
3 pole—Size 3
100 ampere



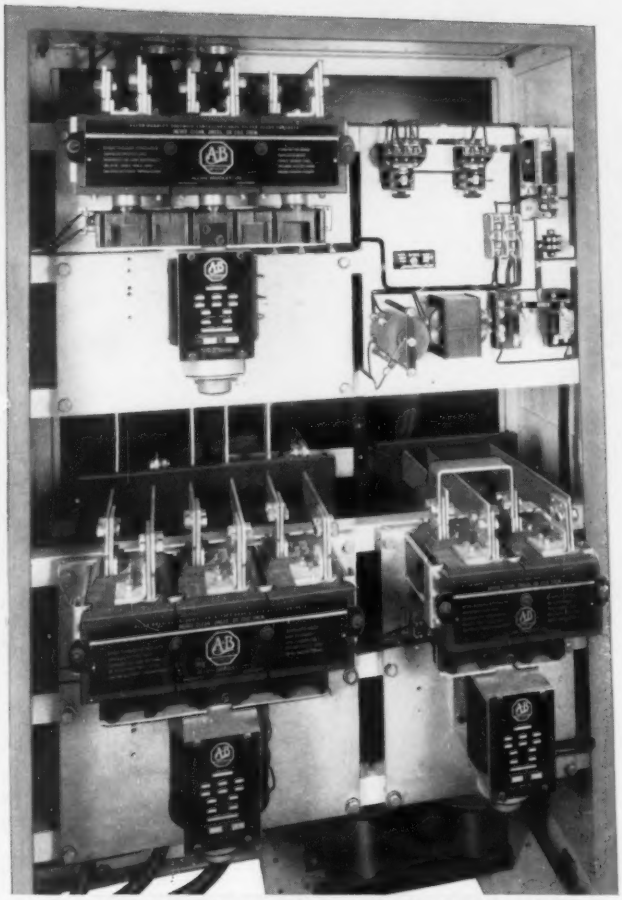
3 pole—Size 4
150 ampere



3 pole—Size 5
300 ampere



3 pole—Sizes 6 & 7
600 & 900 ampere contactors



250 Hp, Bulletin 746 automatic autotransformer showing Allen-Bradley Size 7 contactors

A-C and D-C CONTACTORS

10 to 900 Amperes

with Double Break, Silver Alloy Contacts

The only complete line of solenoid contactors on the market. Allen-Bradley offers nine sizes... from Size 00 (10 amperes) to Size 7 (900 amperes), one to four poles.

There is no contact maintenance . . . no pins, pivots, or bearings to give trouble. Just one moving part—the simple solenoid plunger. Operating characteristics are consistent for all nine sizes.

Enclosures can be supplied for general purpose, water-tight, dust-tight, and explosion-proof service.

Allen-Bradley controls are an added sales asset to any machine. May we send you our catalog?

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.
In Canada: Allen-Bradley Canada Ltd., Galt, Ont.

A-B Quality

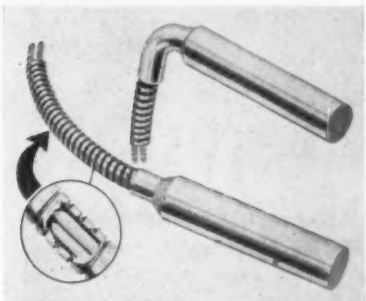
ALLEN-BRADLEY
SOLENOID CONTACTORS
QUALITY

1-56-MR

Foot Warming Pad

(11) General Industrial Co., 5750 N. Elston Ave., Chicago 30, Ill.

Electrically heated neoprene rubber mats that plug in to ordinary household or office circuits are one solution to the cold feet problem, according to this manufacturer. Mats are 14x21 in. and are said to use less energy than a 75-w light bulb.



Moistureproof Conduit

(12) Edwin L. Wiegand Co., 7500 Thomas Blvd., Pittsburgh 8, Pa.

Moisture and vapor protection is provided by a new flexible rustproof brass conduit for this manufacturer's electric cartridge heater. Straight or 90° angle fittings are specially brazed to the heater sheath and the conduit is permanently sealed to the fitting for positive moisture protection to the lead wires, the manufacturer reports.

(13) SOLDERING GUN—Wen Products Inc., 5804 Northwest Highway, Chicago 31, Ill., recently introduced a new pistol-shaped soldering device that is reported to come up to working heat in less than five seconds. A built-in spotlight illuminates the working area. Tip is silver plated and said to be extra rigid. It is removable.

NEW KILLARK

EXPLOSION-PROOF LIGHT FIXTURE

Series "H" Fixture combines excellent lighting efficiency with cooler operation, greater safety, easier installation and maintenance.

NEWLY-DESIGNED SERIES "H" FIXTURES HAVE THESE OUTSTANDING FEATURES:

BETTER LIGHTING—Auxiliary anodized aluminum reflector increases light output, resulting in more efficient distribution of light.

SAFER LIGHTING—Cooler operation increases safety factors; rugged construction confines explosions within system.

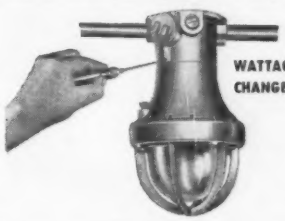
STREAMLINED—Attractive, compact. No ledges to catch dust.

LIGHTWEIGHT—Made of non-rusting, non-sparking aluminum alloy.

EASY RELAMPING—No tools needed.

WATTAGE QUICKLY CHANGED ON JOB—All sizes fit standardized splice boxes.

U. L. APPROVED—Listed by U. L. for Class 1, Groups C & D locations.



WATTAGE QUICKLY CHANGED ON THE JOB

EASY TO RELAMP WITHOUT TOOLS

CONTACT YOUR WHOLESALER

DALLAS . . . . . 1903 Griffin St.
DENVER . . . . . 1073 Galapago
LOS ANGELES . . . . . 412 Seaton St.
SAN FRANCISCO . . . . . 714 Harrison St.
SEATTLE . . . . . 4130 First Ave., S.
KANSAS CITY, MO. . . . . 616 W. 26th St.

CANADIAN REPRESENTATIVES:
E. A. Adams, Griffon Sales, Ltd., 188 W. 5th Ave., Vancouver 10, B. C.
A. H. R. Louden Agency, 7608 88th Ave., Edmonton, Alberta

Killark
ELECTRIC MANUFACTURING COMPANY
VANDEVENTER AND EASTON
ST. LOUIS 13, MISSOURI

NEW, IMPROVED TYPE

screw anchor expanders

quickly set anchors in masonry of any thickness, holes in varying depth

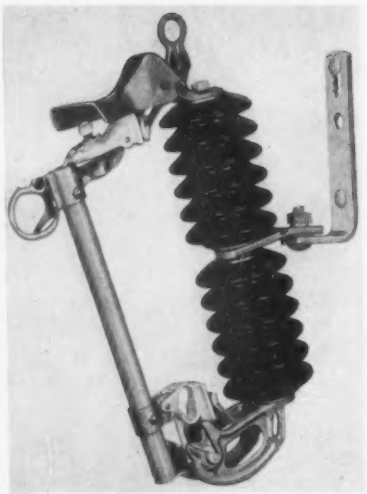
Now, with the GREENLEE Screw Anchor Expander you can rapidly and *securely* set lead screw anchors *flush* with the surface of masonry . . . *regardless of its thickness . . . regardless of hole depth.* Eliminates all guesswork . . . the expander tool positions the anchor *positively* every time. Fast, easy operation. Simply drill hole, screw lead anchor onto expander, insert in hole, then strike the expander head with hammer or mallet. It is the ideal tool for setting anchors to hold meter boxes, lighting fixtures, hangers, and other equipment. Three sizes for the most widely used sizes of screw anchors. Write for descriptive folder.

TOOLS FOR CRAFTSMEN

GREENLEE

GREENLEE TOOL CO.

1761 COLUMBIA AVE., ROCKFORD, ILL.



Distribution Cutout

(14) Southern States Equipment Corp., Hampton, Ga.

This manufacturer has announced the development of Type 33-F, an open-type distribution cutout. It is a double-vented cutout capable of interrupting fault currents as high as 10,000 rms amp, the company reports.

Aluminum Suspension Clamps

(15) Anderson Brass Works, 700 44th St. N., Birmingham, Ala.

A deep, flared cable groove at the mouths of these suspension clamps is reported to provide for angle pull-off as well as suspension. All sizes in the line have turning angles that permit the widest range of conductor sags, the manufacturer reports.

Push-Button Intercom

(16) Telecom Inc., 1019 Admiral Blvd., Kansas City, Mo.

Selective signaling, common talking, lamp indication when line is in use are three features of this 12-station intercommunication telephone system. Engineered for small businesses, inter-executive offices or domestic applications. Said to be operable up to five miles.

Service Entrance Kits

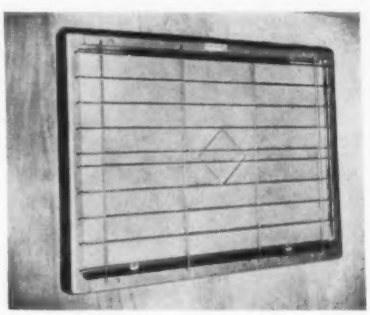
(17) Hubbard & Co., 6301 Butler St., Pittsburgh 1, Pa.

A kit provided by this company contains necessary parts for a mast-type residential service entrance. Included are: entrance head with slip-fitter adapter, roof flange, mounting brackets for mast and an adapter for the meter connection. Kits are made up for use with either a 2-in. or 2½-in. mast and one or more pipe clamp wire-holders.

Weather Sensitive Control

(18) Automatic Devices Co. Inc., Western Springs, Ill.

The outdoor temperature automatically resets the starting and stopping time of a heating system with the use of this time switch, according to the manufacturer. The time switch also features seven-day programming of off-on timing of heating systems. Can be used in any space heating control circuit.



Wall Mounted Heater

(19) Marviray Inc., 54 Clifton St., Newark 5, N. J.

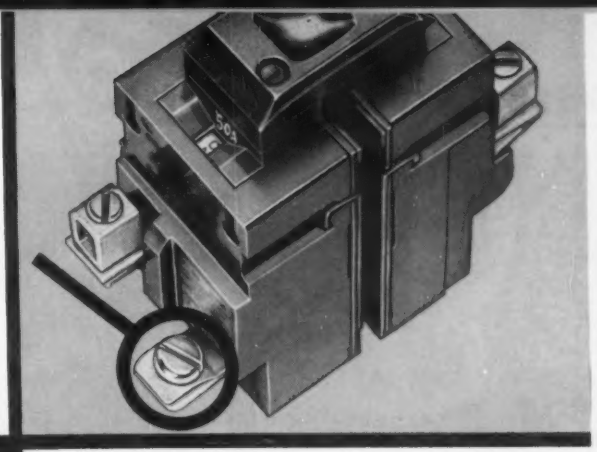
A connected electric heating element under an anodized aluminum heating surface is said to add to the economy, convenience, cleanliness and controllability of this electric space heater. The heater is UL listed and is available for surface mounting or recessing in walls and in wattage ratings of 1,250 and 750 for operation on 115, 208, 230 and 245 v. Other models will be in production later.

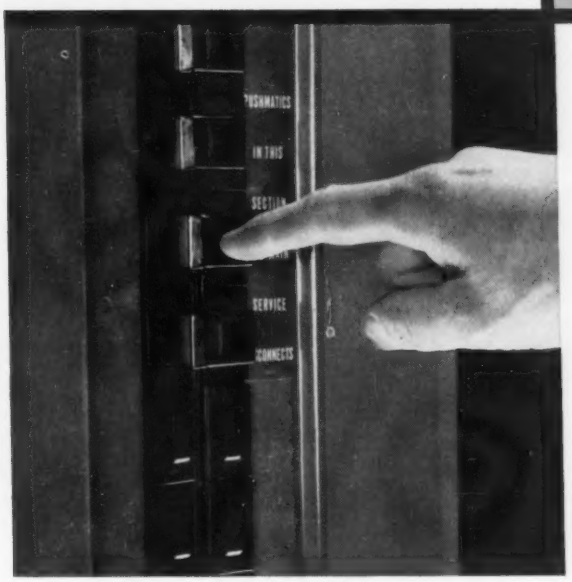
Service Entrance Cable

(20) General Cable Corp., 420 Lexington Ave., New York 17, N. Y.

This 100-amp service entrance cable is rated 75 C, wet or dry, either three conductors of No. 3 wire, or two No. 3 and one No. 5.

THE BIG NEWS in circuit breakers is this BullDog Two-Pole, Common Trip Duo-Guard Pushmatic. Simplifies wiring. Makes installation easier and faster. The new terminal screw retainer (circled) ends fumbling and wasted time . . . you get a *bolted* connection fast.





New Two-Pole "Common Trip" Duo-Guard Pushmatics

The heavy-duty, safe, positive switching and protective device

There's real convenience, real safety in two-pole breakers now. BullDog's new Duo-Guard Pushmatic® Common Trip breakers for Electri-Centers® are now available for two-pole, 220V circuits (15 to 50 amperes)—for residential, commercial, institutional and industrial applications.

Operation of this new two-pole Common Trip Pushmatic is simple and safe. (1) A push of the button gives simultaneous "ON" or "OFF" operation. (2) In the event of an overload or short circuit, both poles are automatically de-energized.

Of course, Duo-Guard protection is built into each Common Trip, too, just as it is into single-pole Pushmatics—your assurance of automatic, two-way protection *in any circuit.*

Ask for a demonstration of the new Common Trip now. See your BullDog field engineer or qualified distributor or write BullDog Electric Products Co., Detroit 32, Michigan.

©BEPCO

IF IT'S NEW... IF IT'S DIFFERENT... IF IT'S BETTER... IT'S **BULLDOG**

ELECTRIC PRODUCTS COMPANY

A Division of I-T-E Circuit Breaker Company

Export Division: 13 East 40th Street, New York 16, N. Y. • *In Canada:* BullDog Electric Products Co. (Canada) Ltd., 80 Clayson Road, Toronto 15, Ont.

CONSULT THE FOLLOWING PACIFIC COAST REPRESENTATIVES:

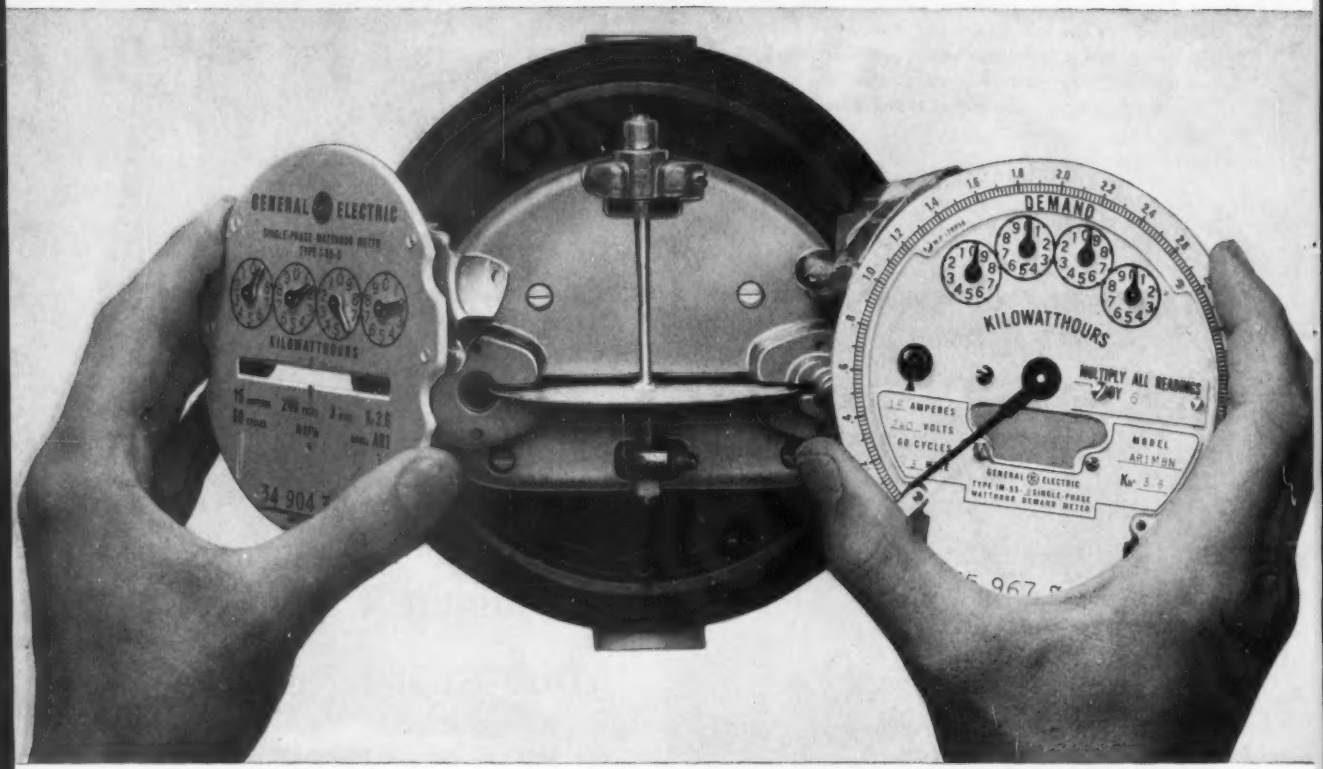
COAST ELECTRIC & MANUFACTURING CO.
1733 N.E. Seventh Avenue, P.O. Box 7712
Portland 12, Oregon

YOUNG ELECTRIC & MFG. CO.
2134 Curtis St.
Denver 2, Colorado

SAFETY SWITCHBOARD COMPANY
910—89th Avenue
Oakland 21, California

BULLDOG ELEC. PROD. CO. OF LOS ANGELES
2885 E. Washington Blvd.
Los Angeles 23, California

DEMAND METERING



DEMAND REGISTERS OFFER MAXIMUM FLEXIBILITY, MAY BE INSTALLED ON ANY G-E SINGLE-PHASE OR POLYPHASE METER

Demand Registers: The Most Reliable Means to Low Cost Demand Metering

- Increasing number of utilities are taking advantage of the benefits offered by demand registers
- Flexibility of register assures reduced inventory and operating costs
- Greatly reduced testing and maintenance expenses have resulted from improved designs

The dependable low-cost operation of mechanical demand registers has led to their increasing acceptance by the utility industry.

General Electric engineers have released test results which give assurance of increased reliability of demand registers. These tests show that the life of the register rotor has been extended up to 10 years. This fact means that the register will need testing and maintenance only during periodic meter tests. This assurance of dependable performance offers the utilities unlimited savings in their demand metering operation.

DIRECT GEAR DRIVE . . . Not only is the register on the same testing basis as the meter but also the demand register possesses the same stability of calibration as the watthour meter. This high degree of accuracy remains unchanged during life, and thus assures reliable operation for years. In comparison with other types of demand metering devices, the register is relatively unaffected by such variables as friction and climate.

REGISTER FLEXIBILITY . . . The versatility of design of General Electric's demand register offers the opportunity of converting the register to different scale classes, different electrical ratings, or any

available time interval. Standardization on one register ratio with a change in only the multiplier is but one of the many cost-saving methods which is available with only a demand register.

REDUCED INVENTORY . . . The opportunities for reduced inventory are unlimited with the use of demand registers. Any stock single-phase or polyphase watthour meter can be converted to a demand meter merely by substituting a demand register. This adaptability which results in reduced inventory and operating costs is unique only with demand registers.

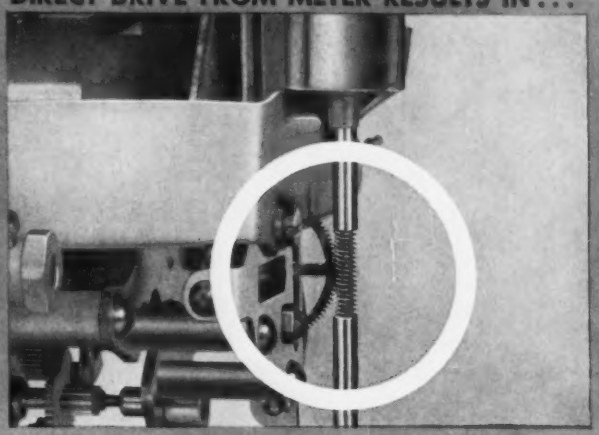
IN SERVICE . . . A watthour meter can be readily converted to a demand meter simply by the interchanging of registers. Also, quick, easy, accurate and low-cost field testing can be realized with demand registers. With the use of a G-E self-checking adapter, the need for elaborate testing equipment and costly hours of labor is eliminated.

These facts offer you the greatest possible assurance that General Electric's demand registers are your most reliable means to low-cost demand metering.

MANY UTILITIES . . . Increasing numbers of utilities are taking advantage of the benefits offered by demand registers. Here are but a few: Commonwealth Edison Company, Wisconsin Electric Power Company, Kansas Power and Light Company, Duke Power Company, Pacific Gas and Electric Company, Southern California Edison Company, Public Service Company of Oklahoma, and New Orleans Public Service Inc.

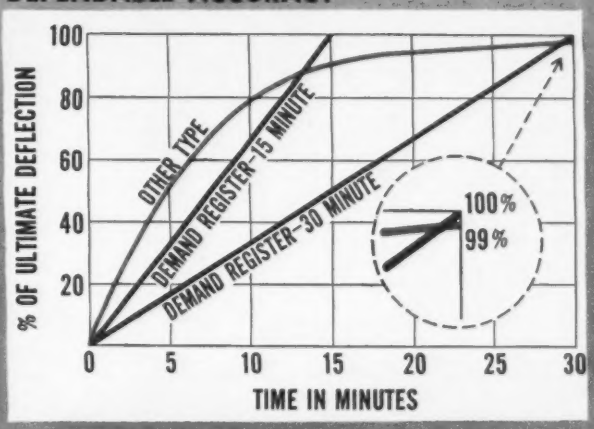
FOR MORE INFORMATION . . . If you would like more information on General Electric's mechanical demand registers, write to Section 621–12, General Electric Company, Schenectady 5, N. Y.

DIRECT DRIVE FROM METER RESULTS IN . . .



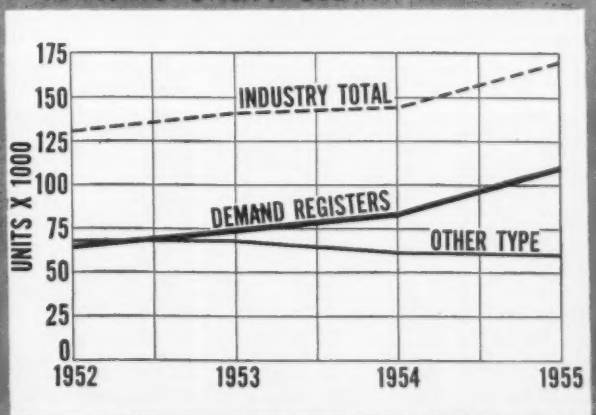
DIRECT GEAR DRIVE from the meter assures sustained accuracy for years.

DEPENDABLE ACCURACY



ONLY REGISTERS reach 100% of average demand after rated time interval.

INCREASING UTILITY USE



INCREASING USE of demand register results from dependable operation.

Progress Is Our Most Important Product

GENERAL ELECTRIC

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

• Preformed Line Guards will save money on short-span urban distribution lines . . . whether ACSR, all-aluminum, or copper conductors are in use. Use them on all conductors where protection against vibration damage is not essential and standard Armor Rods may not be needed. Line Guards are smaller in diameter—fit insulator grooves of both old and new designs. Check P L P price lists. You will notice Line Guards are *lower* in price than Armor Rods . . . yet, Line Guards provide sufficient protection on short spans.

Line Guards . . . developed from Armor Rods—are used like Armor Rods . . . protecting conductors against arcover, chafing, and mechanical wear due to concentrated stresses on light or short-span construction.

Let your P L P Representative help you select the most economical P L P Product for your application. Write or call Cleveland: EX 1-3571.

**Made in accordance with or for use under one or more of the following U. S. Patents: 2,275,019; 2,587,521; 2,609,653; 2,691,865; other patents pending.*

Pin Insulator
Line Guards should be used over the conductor where tie wires are applied . . . guard against tie-wire damage.
Line Post
Line Guards permit you to apply your ties as tightly as needed without fear of conductor damage.
Clamp Type
Line Guards fit snugly . . . cushion the conductor from clamp-pressure damage and concentrated stresses.

PREFORMED LINE PRODUCTS CO.
6349 St. Clair Avenue
Cleveland 3, Ohio

High-Voltage D-C Tester

(21) Associated Research Inc., 3758 W. Belmont Ave., Chicago 18, Ill.

A new and higher voltage addition to this company's line of mobile d-c test units is Model 469, with an output of 0-70 kv, d-c at 2.5 ma. The unit was primarily designed for acceptance and proof testing of cables up to 15 kv, but is equally applicable to rotating machinery, switchgear, transformers, etc., according to the manufacturer.

Enclosure Equipment

(22) Huenefeld Co., 2701 Spring Grove Ave., Cincinnati 25, Ohio.

A new Boss line of electrical cutout boxes, pull boxes, transformer cabinets, telephone cabinets and custom-built electrical enclosures is announced by this manufacturer. More than 80 sizes of surface cabinets are available in six different depths. Flush-mounted units are available, too. The line is UL listed. Complete details in catalog CB-4.

(23) **WIRE STRIPPER** — A handy-type stripper, called "Stripmaster," is offered by Ideal Industries, Sycamore, Ill. A single-squeeze operation strips wire up to ⅞ in. and the jaws snap into position for the next use merely by releasing the grips.

(24) **PUSH-BUTTON ENCLOSURE**— Hoffman Engineering Corp., Anoka, Minn., has announced a new line of oiltight enclosures for all standard makes of oiltight push buttons, switches and pilot lights. Standard enclosures are available for 1, 2, 3, 4, 6, 9, 12, 16, 20 and 25 control units.

(25) **DRAFTING BOARD LAMP** — A special light louvered shade on this new lamp for use over a drafting board is said to reduce contrast and allow dust to carry on through the shade. The new lamp is mounted on an adjustable arm for easy proper location. Made by Faries Lamp Division, Elwood, Ill. Contains a fluorescent lamp.

The NEW "REDEGE" Benfield Bender

3 tools do all hand bending jobs of both rigid Conduit and EMT

Here is a new one-piece hand tool for bending Sherarduct, other types of rigid steel conduit, and Xduct Junior electrical metallic tubing.

It's the first universal portable hand bender ever to be developed which can be used for both rigid conduit and thin wall tubing. A low cost tool, competitively priced, it eliminates the need for bench-mounted bending equipment for small size conduits.

CHECK THESE FEATURES:

One piece—with solid non-skid hook

Extended foot treadle—gives extra bending leverage

Safety reinforcing collar—removes strain from threads

Built-in back pusher

Bender is also measuring gauge—rules, tape measures often unnecessary

Five year guarantee against breakage or defects

Peek hole for left-handed use

3 TOOL SIZES

Catalog #1050—Bends ½" thin wall

Catalog #1075—Bends ¾" thin wall and ½" rigid conduit

Catalog #1100—Bends 1" thin wall and ¾" rigid conduit

Make the Test . . . Combine the Best—Sherarduct Conduit and the Redege Bender

National Electric Products

TORRANCE, CALIFORNIA

Branch Offices: San Francisco • Seattle • Denver
Los Angeles • Salt Lake City • Portland • Phoenix

ARE YOU SURE

this cable isn't injured or shorted out?

When you *hammer* a staple in, the plain fact is that you can't be sure! A staple driven in at the wrong angle or driven in too far can damage cable and cause shorts. And if the old staple is removed and another put over in the same place, not even a sharp-eyed electrical inspector can tell if the cable has been damaged!

ABSOLUTELY!

if you use Arrow's T-75 Automatic Staple Gun!

It can't possibly damage cable! The grooved head fits over the wire so that the legs of the ejected staple can't pierce the cable. And the staple hammer stops staple automatically at the right height. Add this safety feature to the fact that the T-75 cuts stapling costs up to 70%, you'll find you can't afford to do without it.

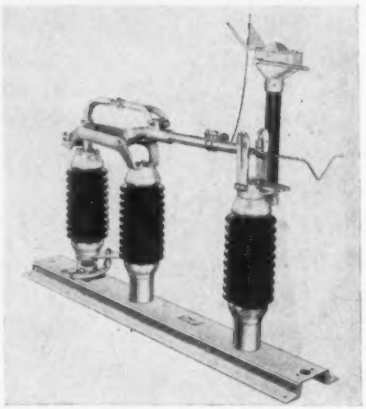
ARROW'S T-75

for stapling non-metallic sheathed cable up to ½" in diameter.

Uses ⅜", ⅝", ⅞" Arrow T-75 tack-pointed staples ..... List: **$15**
For all wires under ¼" in diameter, Arrow T-25 Staple Gun ..... List: **$15**

Write for catalog and further information

ARROW FASTENER COMPANY, Inc. • One Junius Street, Brooklyn 12, N. Y.



Interrupter Switch

(26) R&IE Equipment Division, I-T-E Circuit Breaker Co., Greensburg, Pa.

A single, multigap interrupter unit capable of interrupting full load current up to 46 kv is announced by this company. It can be furnished in 23-, 34.5- and 46-kv ratings for 600-amp continuous and interrupting duty. The new switches are recommended by the manufacturer for switching of high-voltage capacitor banks, their full rated load current, magnetizing currents of transformers and line charging currents.

Safety Eyewear Frame

(27) Bosch & Lomb Optical Co., 635 St. Paul St., Rochester, N. Y.

What is said to be the first combination metal and plastic industrial safety eyewear frame is introduced by this manufacturer. Features include: nonflammable acetate butyrate frame; metal bridge plated to resist corrosion and adjustable nose pads. Metal crosses on frame indentify the product as safety glasses with safety lenses.

Current Limiting Tester

(28) Ideal Industries Inc., 1042 Park Ave., Sycamore, Ill.

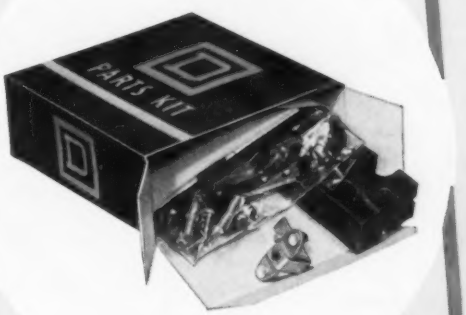
Special current-limiting resistors, wire wound and ceramic insulated, are built into each test prod of this company's new voltage tester. By limiting current in the leads to a maximum of one amp at 250 v, the operator is protected from the results of accidental shorts or breakdowns.

For Bulletins, Fill in the Coupon on Page 50

Here's Why We Specify
SQUARE D Starters
on the Machinery We Buy

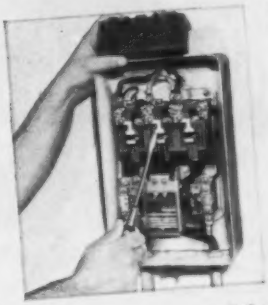
PERFORMANCE, EASY INSPECTION AND MAINTENANCE

Sure, we like Square D performance because it keeps our "down time" at a minimum. BUT—everybody knows that even the best starter needs periodic inspection and preventive maintenance. We like the way Square D makes it easy to handle those routine jobs.

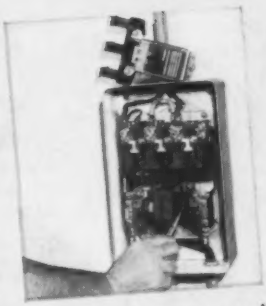


OFF-THE-SHELF PARTS KITS

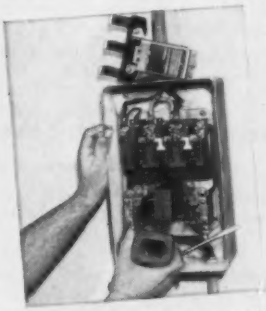
They make normal maintenance and modifications easier than ever. Packaged parts include interlocks, contacts, coils, overload relays, pushbuttons and selector switches. They're easy to buy, easy to identify, and faster to install.



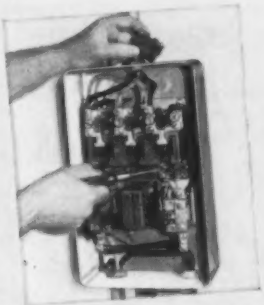
1 Loosen two screws and the arc chamber cover comes off. Every contact surface can be inspected at a glance.



2 Remove four screws and entire movable assembly can be lifted off. Disconnect two wires and slip off magnet coil.



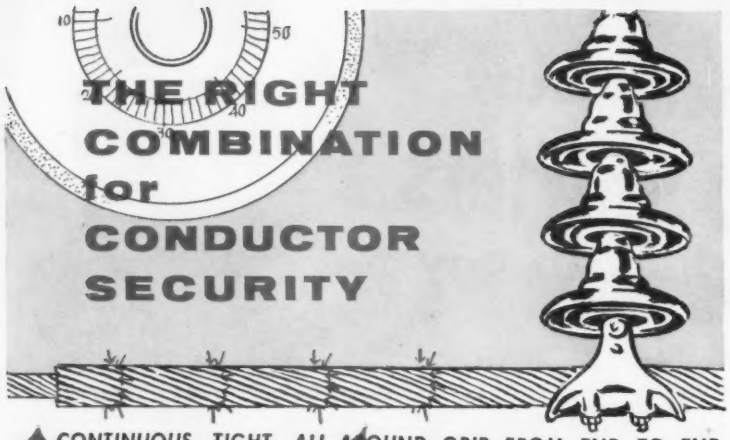
3 Contacts are attached with separate screws—they can be removed and replaced without disturbing any wiring. A screwdriver is the only tool needed.



4 Sizes 0 through 4 starters have these separate mounting electrical interlocks for easier installation. Contact block is attached from front of panel with two screws.

ASK YOUR ELECTRICAL DISTRIBUTOR FOR SQUARE D PRODUCTS

SQUARE D COMPANY



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Fanner Superformed armor rods contact conductor permanently and tightly *at every point* — not just at clamps.

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LOW INSTALLED COST

Fine Fanner Superformed Rods provide both initial and long term economy through low cost, easy application and multiple capabilities.

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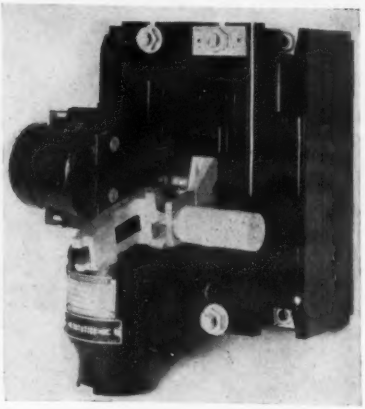


Motor-Operated Breaker

(29) Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa.

These motor-operated circuit breakers are for remote or automatic operation and are said to combine in a single unit all equipment necessary for electrical switching, thermal protection against overloads and magnetic protection against high fault currents. It can perform up to four switching operations per minute for extended periods.

Portable Electric Heater

(30) Edwin L. Wiegand Co., 7500 Thomas Blvd., Pittsburgh 8, Pa.

Outputs up to 13,648 Btu are claimed for this new portable electric heater measuring 15 in. high by 14½ in. wide and 9 in. deep. A tubular chrome support stand allows directing of heated air stream up and down, and swivels to form wall or ceiling mounted bracket. Equipped with a safety overheat device and manual reset and with electric fan.

Explosionproof Panelboards

(31) Crouse-Hinds Co., Wolf & Seventh North St., Syracuse 1, N. Y.

This company's type EWP panelboards were especially developed for hazardous locations and for installations where corrosive vapors, dusts or moisture are present. Compactness is a feature of the design. Functioning as load centers or panelboards, the assemblies provide circuit protection on wiring systems up to 120 v.

(32) DUCT SEALING TAPE — A new cotton cloth tape produced and tested especially for heating and air conditioning duct sealing applications is announced by Permacel Tape Corp., New Brunswick, N. J. The plastic coated tape is known as Permacel 691.

The Big News for '56

KUHLMAN, ORIGINATOR OF "*Quick Grip*," INTRODUCES A

New High Voltage Bushing

FOR RATINGS ABOVE 5000 VOLTS

Now, KUHLMAN affords new safety, new convenience and new speed in handling high voltage connections on cover bushings of pole type transformers.

In 1939, KUHLMAN introduced the first "Quick Grip" Bushing for 5000 volts and below. The principle of this bushing has, since then, been adopted by most of the country's leading transformer manufacturers. Linemen all over the world prefer KUHLMAN "Quick Grip" Bushings . . . no tools are necessary . . . no live parts are exposed . . . connections are simple, safe and fast. Check all these advantages:

Easy Installation—the line lead is simply inserted into the hole in either side of the bushing . . . a twist of the knob completes the job!

Complete Protection—the protective knob reduces effects of weather, corrosion and the possibility of animals and birds disrupting service.

Versatile Application—new cover type "Quick Grip" will soon be available on all pole type distribution transformers. Accommodates full range of EEI-NEMA wire sizes.

Your KUHLMAN agent will be happy to explain this high voltage "Quick Grip" Bushing . . . it is another KUHLMAN feature that has provided new standards of distribution transformer service and long life for America's leading utilities.

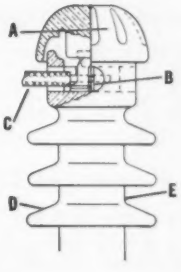
A—Hard rubber cap protects — simple clockwise rotation clamps lead firmly.

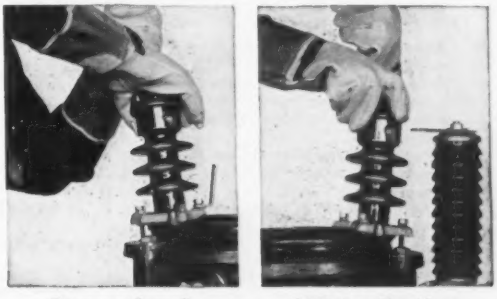
B—Gap Electrode

C—Line leads . . . can be entered from two sides.

D—Porcelain.

E—Corrugations provide ample creepage distance.





Conventional or CSP Application

KUHLMAN ELECTRIC COMPANY

BAY CITY, MICHIGAN • CRYSTAL SPRINGS, MISSISSIPPI • SALINAS, CALIFORNIA

DISTRIBUTED BY MAYDWELL & HARTZELL, INC. Seattle • Spokane • Portland • San Francisco • Los Angeles • Phoenix

sell the
AUDIBLE
SIGNALS
that are
EASIER to INSTALL

Faraday Uni-Pact

1. Wire to safe, dead-front adapter plate from any 4" outlet box, Wiremould or Conduit.
2. Screw adapter plate to fitting.
3. Plug Uni-Pact signal into adapter plate—easy as plugging in any appliance.

... and give amazing
Flexibility, too!

12 different sound instruments all fit one adapter plate

Handle signal systems? Here's why it will pay you to feature Faraday Uni-Pact:

Easier to install — you make more profit on each installation.
Easier to sell—gives your customers amazing flexibility (horns, buzzers, bells, chimes all plug into one adapter plate).
Virtually damage-proof—sound instruments go on after rough-in men are finished.
Safer to install—no exposed terminals in dead-front adapter plate.

Note: *Smart contractors rely on Sperti Faraday engineering for the best in:*
Annunciators • Synchronous Clocks • Door Openers • Fire Alarms • Transformers • Electric Clock Systems • Contact Devices • Freezer Alarms • Sirens • Plugmaster Cord Sets.

Sperti Faraday Inc.

Engineers in Sound and Sight Since 1875
ADRIAN, MICHIGAN

BULLETINS ETC.

(33) UTILITY TRUCK BODIES—Complete dimensional data and standard and optional features of J. H. Holan Corp. Series 7000 construction and general-purpose utility truck bodies are carried in a new publication. Write to the company at 4100 W. 150th St., Cleveland 11, Ohio.

(34) PRODUCT SELECTOR — Information for architects, contractors and engineers is contained in a product selector covering a wide range of service entrance equipment, safety switches and lighting and distribution panel boards. It is available from the American Electric Switch Division, Clark Controller Co., 1146 E. 152nd St., Cleveland 10, Ohio.

(35) MERCURY-VAPOR LAMPS—Two booklets on mercury-vapor lamps have been announced by Sylvania Electric Products Co., 1740 Broadway, New York 19, N. Y. The titles are "Mercury Vapor — Today's Most Effective Street Lighting Source" and "More Light for Less Money." The two cover street lighting and industrial applications.

(36) SPLICE BOXES—Various types of splice boxes are described and illustrated in a bulletin published by G&W Electric Specialty Co., 7780 Dante Ave., Chicago 19, Ill.

(37) PROMOTIONAL COMIC BOOK—Allis Chalmers Mfg. Co. is making available a four-color comic book devoted to utilization of electricity. It is entitled "The Ghost Town That Came to Life." The booklet also touches on adequate wiring. It is available to members of the industry who can use a handout piece for community relations programs. Write to 1126 S. 70th St., Milwaukee 1, Wis.

(38) INSULATING AND JACKETING—Characteristics and technical description of E. I. du Pont de Nemours & Co. polychemicals department products are carried in the first of a series of bulletins. The series covers insulating and jacketing materials for wire and cable. Write to the company at Wilmington 98, Del., for the series.

(39) LOAD TAP-CHANGING EQUIPMENT—Operation and application of type 220 load tap changes of Pennsylvania Transformer Co. are described in a new 16-page illustrated booklet. The equipment described is furnished on all the company's load tap-changing transformers up to 7,500 kva, on three-phase step-voltage regulators up to 750 kva and on all sizes of single-circuit unit substations.

(40) TEST INSTRUMENTS—A new folder presenting the Multi-Amp line of portable high current test instruments for accurately checking, calibrating and coordinating reclosers, sectionalizers, induction disk relays and similar electrically actuated protective devices is offered by Multi-Amp Corp., 10 Third St., Newark N. J. Ask for data sheet 4755.

(41) LIGHTING FIXTURES—Industrial units and cove lighting equipment are covered in new catalog sheets available from Day-Brite Lighting Inc., 16 N. 9th St., St. Louis, Mo.

(42) ELECTRICAL HEATING—Berko Electric Mfg. Co., 212-40 Jamaica Ave., Queens Village, N. Y., is offering a catalog that embraces all of the firm's glass electric radiant heat panel line. Also contained is information on both low voltage and line voltage thermostat controls. Fully illustrated.

KILL TWO BIRDS WITH ONE STONE — Fill out this coupon and get back valuable information from as many sources as you indicate.

ELECTRICAL WEST
68 Post St., San Francisco 4, Calif.

Not good after March 1

Please send me, without obligation, the new product information or catalogs:

If described in Product News, circle item number

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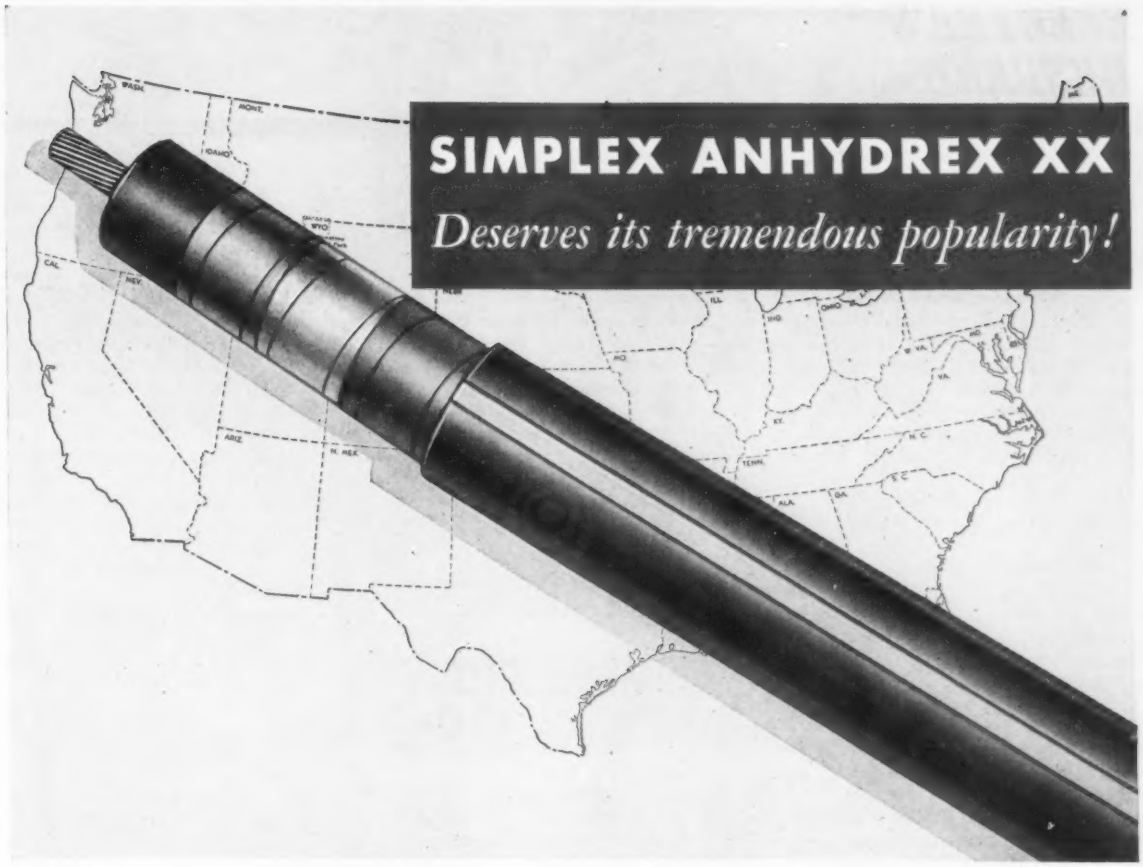
* Please include your company's name and your position, as we cannot ask manufacturers to furnish literature unless you do.



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Deserves its tremendous popularity!

- Simplex-ANHYDREX XX insulation is made for cable operating at 3kv to 25kv and over.
- It resists heat, ozone, oxidation and water even AFTER *aging for 7 days at 250°F.*
- Rated at 85°C. to 15kv and at 80°C. above that, it's used in ducts, overhead on messenger wires, or underground.
- ANHYDREX XX eliminates need of a lead sheath.
- It eliminates problems of oil migration, sheath creeping, corrosion, electrolysis, bonding and joint wiping.
- ANHYDREX XX-insulated cable is lighter and more flexible than lead-covered cable.
- ANHYDREX XX Cable is made with a tough neoprene jacket, submarine armor wire, or other suitable outer covering.

Simplex Bulletin 1009A tells more about ANHYDREX XX high voltage insulation. Write for it today.

Simplex **ANHYDREX XX CABLE**

SIMPLEX WIRE & CABLE CO., 79 Sidney Street, Cambridge 39, Mass.

ELECTRA'S HUSBAND

AFTER DARKNESS COMES LIGHT

"DAMN, there goes the electricity," Electra muttered fretfully as the kitchen lights dimmed and brightened two or three times and then went dark early one evening at the height of the pre-Christmas storm that lashed the Pacific Coast from end to end for several days last month. "How can I finish baking these cookies?"

"Wait a second or two," I cautioned. "Whatever fault that has hit the lines may clear itself before the breaker locks out our circuit." Actually the lights were burning brightly and steadily before I had finished speaking.

"That's a lot of gobble-de-gook to me and if I don't understand what you mean, there are millions of other people in this area that are equally in the dark and that's no pun," she commented. "All I know is that when a storm like this hits, the power is likely to go off and to stay off anywhere from a few minutes to several hours."

"Well briefly and simply, what happens is that automatic switching equipment and relays go into action when something hits the power lines," I explained. "If a small branch blows across two wires and shorts the line this equipment starts functioning. A switch opens and closes several times following a reasonable time delay and if the branch burns off, the line stays locked in. However, if a pole blows over or a tree falls on the wires, the switch locks the line out until a trouble crew makes repairs, tests the line and manually closes the circuit."

"That's enough," she interrupted protestingly. "You're not going to make an electrical engineer out of me this late in life. Moreover I'm not sure that you know what you're talking about."

"Oh skip it, I was only trying to increase your knowledge," I growled.

Just then the lights went up in an especially bright burst and faded gently out. I knew immediately that this was a real interruption.

"Don't sit there, get a flashlight or a candle," Electra said irritatedly. "There are candles on the dining room table and on the sideboard."

"How about matches," I said laughingly.

"Find them yourself," she snapped.

"This reminds me of what happened at the PCEA meeting in Honolulu," I said in an endeavor to ease the tension. "Right in the middle of the opening session, the lights in the hotel went out. Harry Field, the general convention chairman, brought in a flashlight for the speaker, who stood on the platform and read his speech while he held the flashlight on the pages. The crowd got a big laugh out of it, but the program went right ahead even though the power was off for half an hour."

"That's a fine thing to happen to an electrical meeting," she commented. "As a matter of fact I think it would be a good idea if the power went off a little more often than it does. It would teach people just how dependent they are on electricity. Why don't you advocate something like that?"

"Listen, every power company in the country is trying its level best to cut outages to a minimum and to give absolutely reliable service," I reasoned logically. "There is so much electric cooking and heating in homes and so much automation in factories that they must maintain almost perfect service."

"Even so, people would appreciate electricity more than they do if they were forced to forego it sometimes," she argued. "They just don't think of all of the service it provides. Look at us right this minute—no lights, no radio, no refrigeration, no cooking, no heat for the electric blankets. For other folks it would mean no television and no heating if they had an oil furnace."

"You're right," I agreed. "Remember last winter when it almost meant no automobile." I was referring to a stormy trip home from the ranch when the needle on our gas gage was bumping the zero pin. We drove into a service station to get the tank filled and the attendant was helpless—the tanks were pumped electrically, and the power was off over a wide area. The reserve capacity of our gas tank was wonderful. We drove ten miles and four service stations further before we came into a section that was not affected by the outage. We were never more happy to see a gleaming neon over a gas station.

"I'll bet Harry Lee is a busy boy tonight," Electra commented.

"He may be worried because a lot of homes in his division are without power," I continued. "However, it's the trouble crews that are really taking the brunt of it. My guess is that there are about 300 extra men out in this storm working to restore service to those areas where power is off. In a storm like this the power company musters its people in those places where the damage is likely to be heaviest. Actually the dispatcher had an advance weather report and he probably warned the operating department that there would be winds of gale strength in the Bay Area."

"I'll wager that not many people around here are aware of that," she speculated. "Why wouldn't it be a good public relations gesture to feature that?"

"The papers will probably play it up," I said. "They will tell all about the areas where power was off and report the exact length of the outage. They may mention the fact that a lot of utility people worked straight stretches of 16 or 24 hours to get lines back in service. But it will all be incidental to the big storm story."

"But why doesn't the power company run a big ad thanking its own personnel in behalf of the customers?" she argued.

"Because it would sound like it might be tooting its own horn," I said.

"Yes and there's an old adage to the effect that there are times when it pays to toot your own horn," she continued. "If you don't toot it, people won't ever know that you merit attention."

"Let's leave the horn tooting for New Year's," I said.

Just about that time the lights flickered two or three times, came on, then off and finally glowed brightly and continuously. Electra opened the oven of her electric range and took out a pan filled with golden brown ice box cookies.

"If I knew who the men were that put our line back in service so soon, I'd send them a box of these," she commented. "Somebody ought to let them know that electric service is appreciated."

This Seal

shows that every Allis-Chalmers distribution transformer is impulse tested.

Do Your Distribution Transformers Have This *Proof* of Quality?

REGARDLESS of size or voltage, every Allis-Chalmers distribution transformer brings you proof of insulation quality. The "impulse tested" seal on every unit shows that impulse tests were made during production with the most modern impulse testing equipment available to the industry.

Eight years ago Allis-Chalmers initiated impulse testing for pole-type units. Now, every unit through 500 kva, 69 kv and below, gets this positive check to assure that its insulation can withstand severe lightning and surge conditions. No lightning arrester is used. Allis-Chalmers tests the transformer, not the lightning arrester.

Get the facts on this and other A-C production line tests that result in distribution transformers of the highest quality. Call your nearby A-C office or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin.

A-4877

A-C ALLIS-CHALMERS

ALLIS-CHALMERS

AS HIGHER VOLTAGES GAIN MOMENTUM, E. B. Reitz (left) and C. E. Burke, of G.E.'s High Voltage Switchgear Dept., and R. M. Bennett of G.E.'s Switchgear Development Lab, discuss why increased safety, lower maintenance may make air-blast power circuit breakers future industry standard for any voltage. Pictured against three phases of an oil breaker of same rating is one half of one phase of new breaker.

Revolutionary new air-blast power circuit breaker marks . . .

Beginning of new era in transmission system protection

For electric utility engineers concerned with reducing transmission system operating costs, General Electric's new 138-kv air-blast circuit breaker offers real opportunity to meet continually rising loads with modern, efficient electrical apparatus at minimum cost.

Developed for the Consolidated Edison Company of New York, the new breaker, is the first air-blast power circuit breaker manufactured in the United States. The 138-kv breaker, based on 15 years of G-E research on air-blast interruption, is the first of a complete line of breakers through 330 kv, which are expected to be available within two to three years. Prices are to be comparable to those of oil breakers of the same ratings.

COST SAVINGS FORECAST

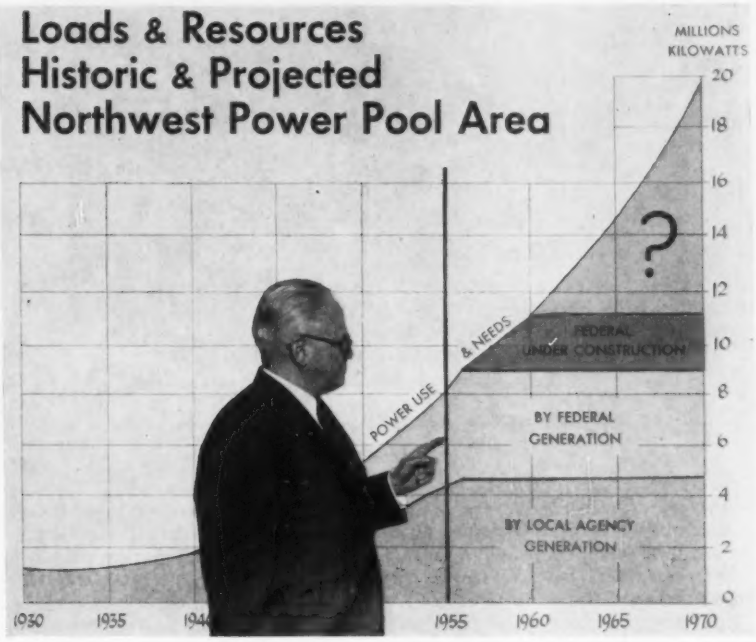
From the viewpoint of operating expenditures, the newly available air-blast breaker should provide utilities with considerable maintenance savings, as well as some relief from the critical manpower shortage. Maintenance requirements can be reduced radically because of absence of oil. Initial filling, scheduled oil filtration and refilling are eliminated.

General Electric engineers are searching constantly for ways to help electric utilities reduce operating costs. The new air-blast breaker provides ample testimony to how this research is paying off. For full information on the new breaker, contact your nearby G-E Apparatus Sales Representative. General Electric Company, Section 301-315, Schenectady 5, New York. 301-315

MORE POWER TO AMERICA

GENERAL ELECTRIC

ELECTRICAL WEST SPOKESMAN FOR MOST HIGHLY ELECTRIFIED REGION OF THE U. S. VOL. 116 NO. 1 JANUARY 1956



Paul McKee points to Chart I showing magnitude of Northwest power problem after 1960

Will it be shortage or

Partnership and Power?

Paul B. McKee*

President
Pacific Power & Light Co.
Portland, Ore.

Supplying Northwest power needs is a big job. Rapid growth of the region can be measured in terms of its demand for electric power—from 1,200,200 kw in 1930 to 7,500,000 kw in 1955. By 1965 the area must have at least 14,400,000 kw to meet its needs. By 1970 the region will need 20,000,000 kw.

These needs can be met if we all get to work. Proposed power projects already on the drawing boards of power agencies of the area can provide more than enough capacity to supply requirements through 1965 and beyond —*if we all get to work.*

Output of major plants is distributed through the Northwest Power Pool serving 1,700,000 customers. Of these more than a million are served by private utilities and 660,000 by public agencies. Through the years our efforts to obtain sufficient generating capacity to take care of the power pool network have not involved a question of whether the plants would be built by local public enterprises or by local private enterprises. We have joined together to bring about the development that the area needs, regardless of local ownership of the enterprise. For example, Grant County PUD is now engaged in trying to build the Priest Rapids project on the Columbia River† and we are making every effort to support them in that enterprise.

Through the Northwest Utilities Conference Committee, composed of public and private local utilities, since 1947 we have urged Congress to take care of the responsibility that it assumed when it started the construction of Bonneville, McNary, The Dalles and Chief Joseph Dams and made it difficult, if not impossible, at that time for us to contribute to those great projects in the way of partnership or money.

In the meantime, both public and private agencies have been developing their own resources. In the past 10 years local public and private enterprises have installed 2,400,000 kw of capacity while the federal government has been installing about 3,000,000 kw. We have been doing our part.

A series of charts will help illustrate the points I wish to make.

Chart No. I is a factual presentation of the load and energy resources from 1930 to date, divided between local public and private generation and federal generation, and then an estimate of what we are going to need by 1970. It will be noted that in 1930 we had about 1,000,000 kw of capacity. In 1940 we came up to about 2,000,000 kw. About that time the federal projects began to come in so that in 1945 we had grown to a point where we had about 2,000,000 kw of local generation and about 1,000,000 kw of federal generation. By 1950 we had about 3,000,000 kw of local generation and about 2,000,000 of federal.

We come to 1955, when we have connected to the power pool more than 8,000,000 kw or will have by the end of this year. About half of this has been installed by local agencies and about half by the federal government. This chart is based on the figures compiled by the engineers of the Pacific Northwest Governors' Power Policy Committee. Figures are in accordance with the understanding of all of the power agencies, public and private, as well as

* Taken from an address before a recent meeting of the Portland Chamber of Commerce.

† FPC license has since been issued to Grant County PUD.

the Bonneville Power Administration.

Looking ahead it will be seen that by 1965 there will be needed 14,500-000 kw to keep the area in power, against our present 8,000,000-kw-plus supply. And by 1970 we must have an estimated 20,000,000 kw. These are big figures. Growth from 1955 to 1960 is estimated at the rate of about 450,000 kw a year, but from 1960 to 1965 it is an average of 660,000 kw a year and from 1965 to 1970 it averages about 1,000,000 kw a year.

Money Needed

How are we going to get this vast amount of power and how are we going to solve this problem? The dollars needed between now and 1965 and on into 1970 to keep up with this march of progress are shown in Chart II.

If the federal government maintains its present construction program on schedule, the dollars shown in the lower section of the chart will be spent. That means principally the completion of McNary, The Dalles and Chief Joseph Dams. With major transmission lines, that will cost about $1 billion. Indicated by the first chart, if that money is spent and these projects kept on schedule it will take care of our needs through 1960.

Before 1960, even though the federal government does maintain this existing schedule and appropriates the money as needed at the rate of $150,000,000 or so a year, something must be done to prepare for the period beginning in 1960 and extending on. The money needed, as shown by the second chart, represents $1 billion. That means in 1956 the federal government will have to appropriate almost $150,000,000, in 1957 about $175,000,000, in 1958 about $140,000,000, in 1959 about $120,000,000 and so on through to the years 1961 and 1962 and beyond.

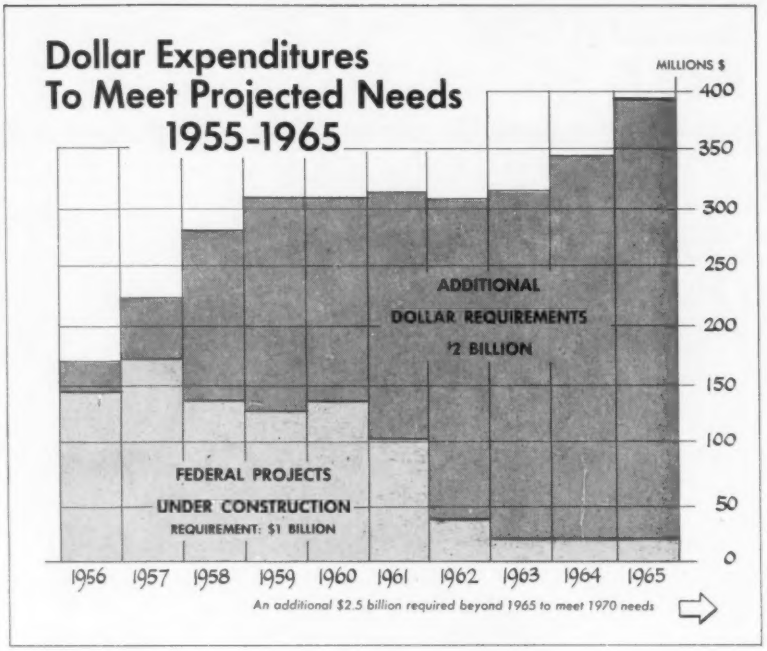


Chart II

In addition to that, however, more dollars are needed starting almost immediately — certainly not later than 1957 — if we are going to meet the growth of the load that will come upon us by 1960. The upper area of Chart II, which totals $2 billion, represents the additional money we must have. It means that in 1957 it will be necessary to spend about $220,000,000; in 1958 nearly $300,000,000; in 1959 more than $300,000,000; in 1960 more than $300,000,000 and going on up. In order to meet the 1970 situation, we must add to the dollars shown on this chart nearly $2.5 billion more for the five years after 1965.

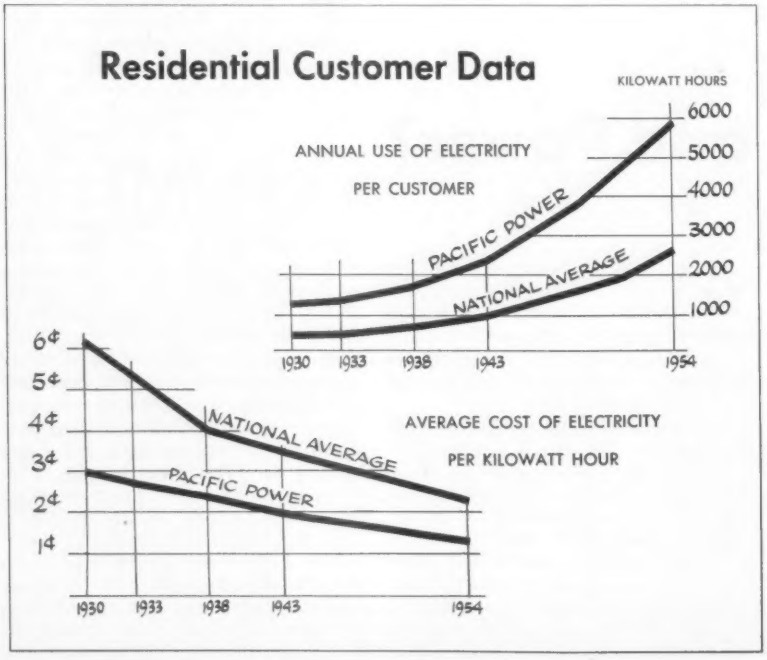


Chart IV

Cooperation Essential

So it is a major problem. It is one that concerns all of us and I am sure that I speak for the whole fraternity of public and private power distributors when I say that we recognize this as a terrific challenge. We need to find a cooperative means by which we may get these dollars, no matter whether federal, public or private. It will take the united efforts of all to keep up with and lick this tremendous problem.

Congress will, I hope, continue these appropriations because without them, of course, we would have to raise that much more money from other sources. I hope those of us who are prepared to invest the dollars of our stockholders and our securities holders in these great developments will have the opportu-

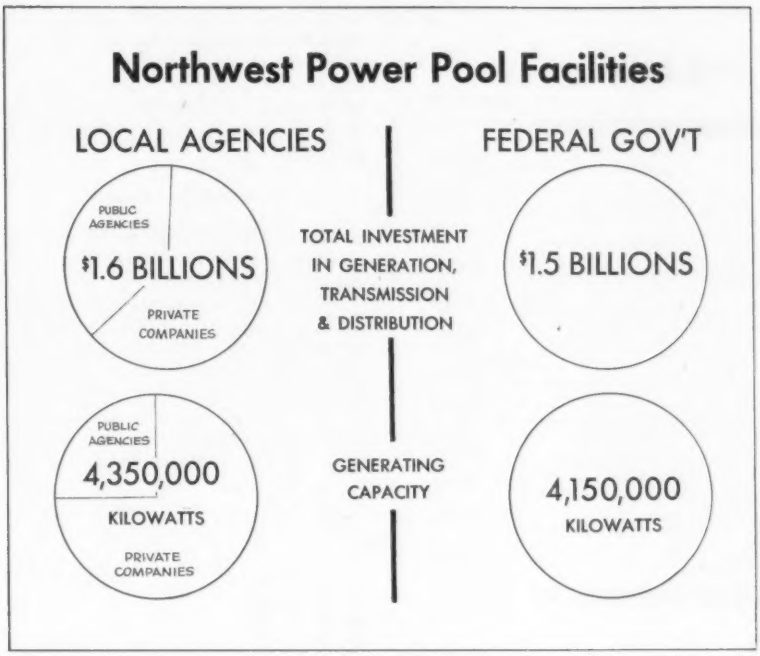


Chart III

nity. Elsewhere it is done. For instance, in California the Pacific Gas and Electric Co. has spent $1.2 billion for new construction since the end of the war and we can do it too if we are given the opportunity.

Chart III is merely another way of illustrating the great financing problem. Between 1945 and 1955 about $1.5 billion have been expended on federal projects. If the federal government is to carry the whole load from 1955 to 1965, we shall have to ask it to spend $3 billion more in that period of time. Having myself been engaged in efforts to interest congressmen and senators from other states in appropriating money for these projects, I am just being very practical when I say this seems just too much to expect.

It has been said a good many times during the past year that since construction of Bonneville Dam started the federal government has done it all for us here in this area. That is not a fact. Chart III shows that local agencies, private and public combined, have spent $1.6 billion in providing the area with power facilities. They have total generation of 4,350,000 kw. The federal government, which started a little later, has spent $1.5 billion and has created 4,150,000 kw.

It will be remembered that when the Bonneville project was announced Franklin T. Griffith, then president of Portland General Electric Co., and I both said that our companies were back of the federal multiple-purpose development of the river and that we hoped the federal government would sell the power properly. We said we thought that if the rest of the nation was willing to put up the money to help us grow we certainly were behind the program. That has been the position of all of us, including my own company, from 1933 and it is the position today. But we do not want to have the people of the United States feel that we are going to lean on them entirely. We must be prepared and permitted to do our part in the development of electric power for this region.

Residential Load Growth

It has been said that it was only when federal power development came in that we in this region began to be big users of electricity. The figures in Chart IV happen to be from Pacific Power & Light Co.'s own records but they are typical of the other power distributors in the area as well. How do we compare with the national average in use of electricity? In 1930 the national average was only about half of our average residential use. In 1933 it was the same and 1938 the same. In 1943, when the government plants began coming in, the ratio still remained approximately the same and today we maintain this fine relationship in comparison with the national average.

During the same period, the cost of electricity to the residential user on the Pacific Power system has declined from 3c per kwh to about 1.3c. The national average has come down from 6c per kwh to 2.67c. There is nothing to be ashamed of in that record. I do not think it took government-subsidized power to cause our customers to continue the relative position they have had with the national average right straight along. For many years we have been blessed here with electricity that

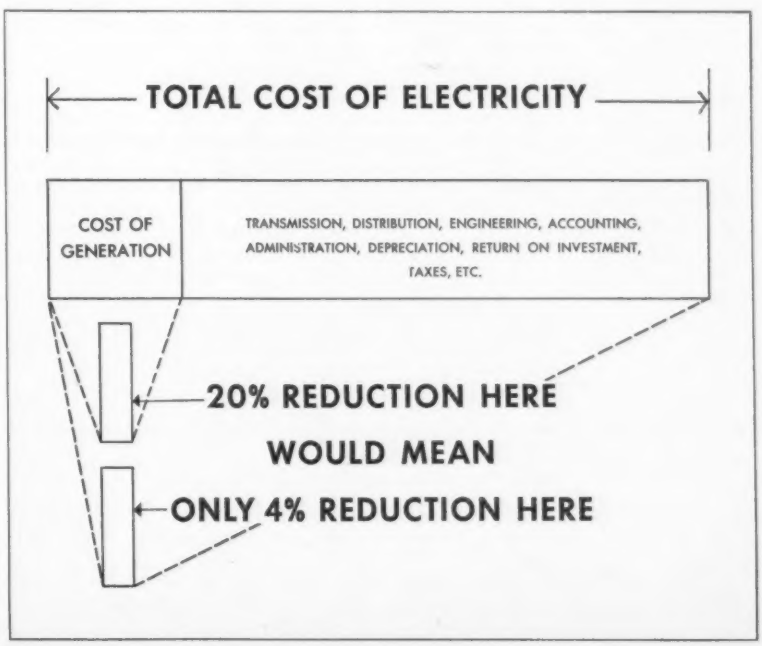

TOTAL COST OF ELECTRICITY
COST OF GENERATION
TRANSMISSION, DISTRIBUTION, ENGINEERING, ACCOUNTING, ADMINISTRATION, DEPRECIATION, RETURN ON INVESTMENT, TAXES, ETC.
20% REDUCTION HERE
WOULD MEAN
ONLY 4% REDUCTION HERE

Chart V

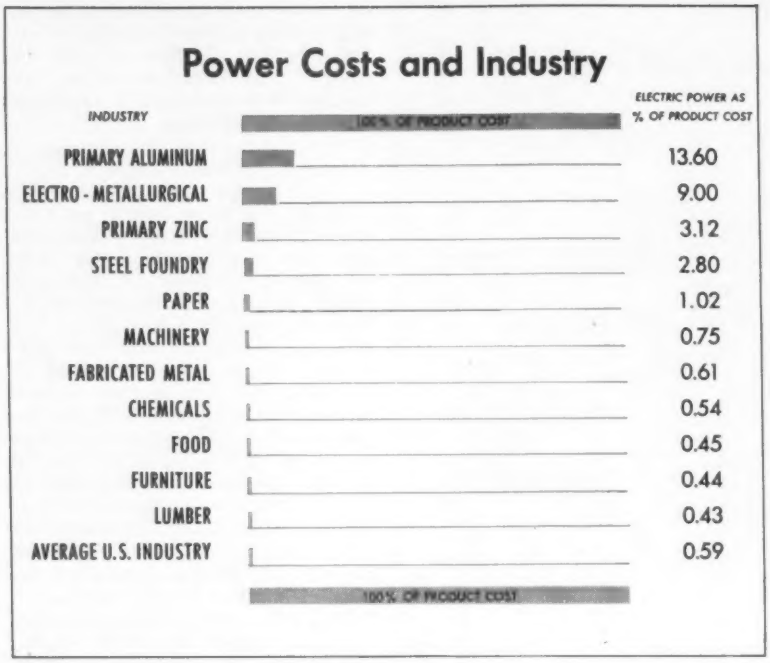


Chart VI

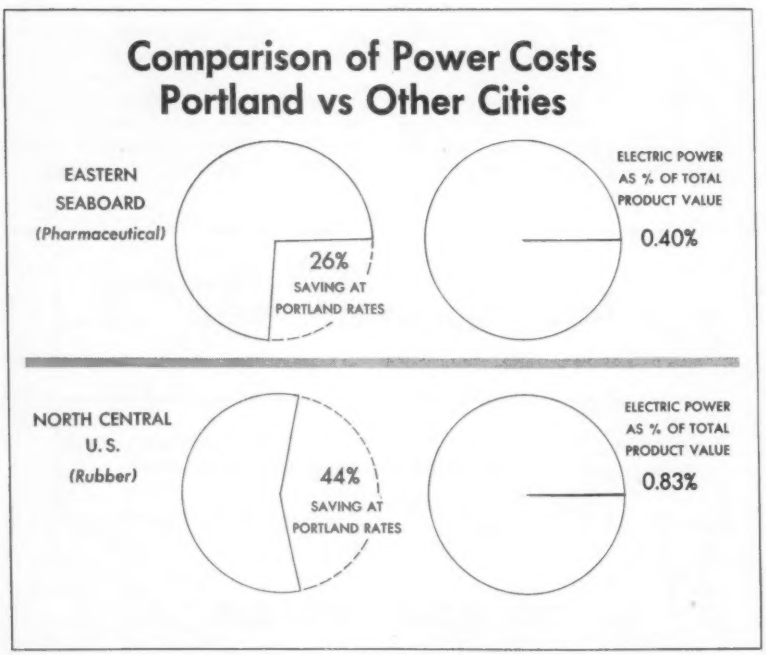


Chart VII

can be produced on an economic basis from hydro power, whether by government or private individuals.

At this point I want to clear up what I think has been a misunderstanding of the relationship between power generated at one of these plants and power as it finds its way to the ultimate consumer. Chart V shows the relationship of the cost of generation to the final cost to the consumer. It will be seen that even though we might be able either to reduce or have to increase, through the payment of taxes, the cost of generation by a matter of, say, 20% that would represent only about 4% of the total cost. In other words, we all have to differentiate between the cost of power at the switchboard and the cost of that same power delivered some place in the Willamette Valley or up in the Yakima Valley or elsewhere in the Northwest.

Industrial Development

Charts VI and VII bring out important points in connection with industrial development.

We struggle to get industries to come to us and what do these industries say to us? A few, like aluminum reduction plants, for example, where 13.6% of their cost is for electricity, are attracted to an area like this if it has tax-free, government-subsidized power available for them. But with most industries that is not the case. They look to other things, such as raw material supplies, markets, transportation, climate, labor supply, political climate and so on. This is clear when it is recognized that the only industries where cost of electricity represents more than 3% of the total cost of production are the primary zinc industry, the electrometallurgical industry and the primary aluminum industry. For paper making and all these others shown on the chart the cost of power is a much smaller item and shrinks almost to insignificance in respect to some industries.

Industries, other than aluminum, are not brought to an area just because of cheap power. Certainly industry wants power. Industry wants power at a modest cost. It wants power in abundance and must have it continuously when needed. But other factors count more with them because for American industry as a whole the cost of electricity represents only about .59% of total production cost.

This idea that the only way we are going to get industry here is to have government-subsidized power is a fallacy. We would not mind having the Boeing plant here, I am sure. The Boeing plant employs between 30,000 and 32,000 people. It uses less than 21,000 kw and it pays on an average 7.5 to 7.8 mills to the City Light system in Seattle. That is considerably more than the federal wholesale rate so frequently quoted as the big attraction for industry! These are fundamental things that all of us who are working together to get this country developed should realize. We should point our efforts in an effective direction instead of scattering our shots and fighting among ourselves over nothing.

The whole purpose of these charts has been to demonstrate that what we need is not just power at the lowest cost we can get but plenty of power so that industry can come here and be assured of an adequate supply.

We have a challenge. Can we lick it? I am confident that we can. The challenge lies in that 20,000,000 kw of electric power needed in 1970. Can those kilowatts be produced from our traditional source, hydroelectric power? The answer in my opinion is *yes*—if we are permitted to do it.

How Needs Can Be Met

To demonstrate how this can be done, Chart VIII shows five columns that include different kinds of power projects. The lower section of the curve, which totals 2,400,000 kw, includes the plants already under way by the federal government—McNary, Chief Joseph, The Dalles, principally, and one or two smaller plants. That will take care of power needs until 1960. If Congress can be persuaded to continue the substantial appropriations mentioned earlier, it will not be necessary to worry about that one.

The fifth bar of the chart represents projects already licensed to local agencies, which could be started almost immediately if various problems standing in their way could be wiped out. They total 1,500,000 kw. These projects include the Noxon plant of the Washington Water Power Co. on the Clark Fork River, Mossyrock project of the city of Tacoma on the Cowlitz River, the Pelton project of Portland General Electric and so on. Those add up to 1,500,000 kw, which would take care of several years' growth in this ascending curve of power requirements.

The fourth bar shows projects for which local agencies have applications pending with the Federal Power Commission that have not yet been acted upon. They include such projects as Mountain Sheep and Pleasant Valley in the middle Snake for which the Pacific Northwest Power Co. has filed an application, the Priest Rapids plant of the Grant County PUD mentioned earlier and one or two others. They total 1,900,000 kw. If one or all of these plants can be licensed and given a go-ahead, a great step will have been taken toward solving the immediate needs following 1960.

The third bar, totaling 2,800,000 kw, is the authorized federal projects such as John Day and Libby Dams and projects on the lower Snake, such as Ice Harbor and others. These could be built by partnerships if legislation can be obtained from Congress. John Day project, for example, with 1,000,000 kw of capacity, would take care of a year's growth at least after 1965. It would require a construction period of about seven years.

The second bar represents other projects under investigation, such as the Swift project of Pacific Power & Light on the Lewis River and a number of others of that caliber that would add up to 2,500,000 kw. A breakdown of the various columns in Chart VIII indicates fully what they are.

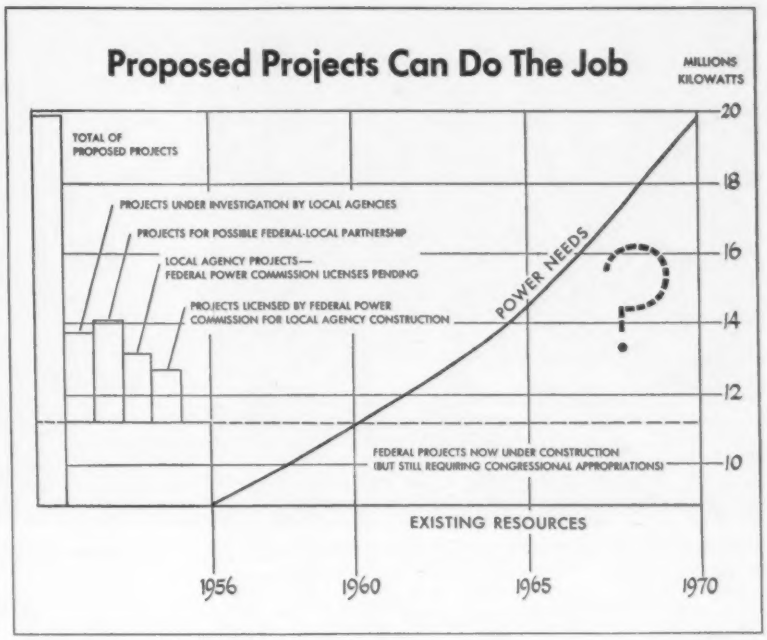


Chart VIII

The lower area of the curve includes the completion of McNary Dam, which will contribute an additional 310,000 kw in 1956, Chief Joseph will contribute 855,000 kw and The Dalles, 960,000 kw. This will take care of needs up to 1960. The upper portion of the chart includes Noxon Rapids, Pelton, plants of Tacoma City Light on the Cowlitz River, if they are permitted to be built, and 900,000 kw of plants which the Idaho Power Co. proposes to build at Hells Canyon, Ox Bow and Brownlee. If they can go forward, that will total 1,500,000 kw, which in this part of our growth is good for about three years and would carry us along until other projects could come in.

Incidentally, it takes anywhere from four to ten years to build one of these plants, so we cannot wait until 1960, when these federal plants are all constructed and working, to start new ones. We cannot wait until then to start building. We have to start now, within a year at most, to get some real dirt flying on some of the projects that are available if we are permitted to build them.

The bar at left in Chart VIII represents 1,900,000 kw. This is made up of 1,000,000 kw at our Mountain Sheep and Pleasant Valley projects on the middle Snake and nearly 1,000,000 kw at Priest Rapids on the Columbia. The latter is a partnership plan. It seems to be all right for the Grant County PUD to have a partnership with the federal government. We agree that they should and we are doing everything we can to help. About 360,000 kw of the power produced at Priest Rapids will come down into Oregon in accordance with the congressional act under which it was authorized for development by the Grant County district. The companies here are prepared to contract for it.

Among projects included in the second bar of the chart are: Pacific Power & Light's 275,000-kw development under investigation on the Lewis River at the Swift and Meadows sites; 250,000 kw under investigation at what is known as Bruce's Eddy up on the Clearwater River; 140,000 kw at Round Butte, on the Deschutes; and 1,100,000 kw at Wells and Rocky Reach on the upper Columbia, which are under consideration by the city of Seattle and certain PUD partners they have in that area and by the Puget Sound Power & Light Co.

This is the way we are going to lick this problem. It can be done. All it takes is a little effort, a lot of money, the right kind of support so that the bankers and other investors throughout the country—and Congress—will realize that what we are trying to do is based on a solid foundation and is a cooperative effort carried on by all the people and the distributors in this area.

The job is no bigger than is being done as part of the day's work in other regions. Needs of the Pacific Northwest *can* be met.

VHF radio backs up power line carrier and telephone circuits that provide main communication between dispatcher and power houses

Power Radio's Changing Function

Harry M. Lewis
California Oregon Power Co.
Medford, Ore.

Like most other youngsters approaching maturity, radio's voice is changing in the West Coast area served by the California Oregon Power Co.

Use of two-way radio for point-to-point load control messages is receding in favor of power line carrier communication. The VHF radios are being used increasingly for local dispatching of service and supervisory vehicles instead.

This change-over has been taking place gradually since the late 1940s, during a time of tremendous expansion. Addition of new generating and transmission facilities opened the door to wider use of power line carrier for system dispatching and at the same time magnified the need for mobile two-way radio in urban areas.

As a result, Copco's radio system that began life with three fixed stations and two mobile units has expanded to 14 bases and about 80 mobiles, now supplemented by 30 Motorola Handie-Talkie portable radiophones.

The company's first use of two-way radio resulted from the acquisition of two small diesel generating plants at Lakeview, Ore., and Alturas, Calif., in 1945. Telephone service eastward to these towns from Klamath Falls was poor, in fact, it often took an hour or more to get a call through.

In view of the occasional usage, expense of building a 100-mile private telephone line was exorbitant. Copco took the problem to the Federal Communications Commission and received an experimental license to link the cities by radio. Two hundred and fifty-watt stations were installed at Klamath Falls, Lakeview and Alturas. Midway gaps were filled in with mobile stations at Bly, Ore., and Tulelake, Calif. The setup worked well for the simple job of passing orders for opening and closing switches.

Copco built a second radio link about a year later when a diesel generating plant at Crescent City, Calif., was added. This extended system control by radio from Grants Pass, Ore., via Cave Junction. Other stations were put in service as the company grew until the present strength of well over 100 transmitters was reached.

Line crew uses radio-equipped power wagon

Copco's growth of 400% in 10 years set off a construction program that is still under way and is keeping pace with increasing demand. Latest additions to the system are eight generating plants on the North Umpqua River, known as the North Umpqua project, on which construction commenced in 1947.

Two-way radio is finding new jobs almost daily at Copco. At the Toketee plant a 250-w station aids liaison between company supervisors and the power plant contractors. Survey parties use Handie-Talkie portable sets to speed their work in laying out new transmission lines across canyons and streams where visual signaling is next to impossible.

Wire stringing is another job where radio has proved immensely profitable. Construction crews find that by using four portable radiophones, they can string more than twice the amount of transmission conductor daily than was possible with field telephones or hand signals.

Where messages formerly were relayed slowly by flagging from one tower to the next, the standard pro-

Power line carrier terminal at dispatching center handles heavy traffic to power plants

cedure now is to place a radiophone at the tension drum and others along at points of sag. We simply talk the wire tight by radio. The company estimates the saving in this application alone at $500 per day.

Currently Copco is experimenting with another time-saver—low altitude patrol of transmission lines by helicopter. The spotter keeps a sharp eye out for broken insulators, sagging conductors or burns where the conductors have swung together and arced across. The helicopter is fitted with a radio to keep in touch with the closest base or mobile station and to report its location from time to time.

During the worst winter months Copco uses Sno-Cat flexible-tread tractors for patrolling lines in the mountains, since these are the only ground vehicles that can cover the rough terrain. For general communications and for sake of safety the Sno-Cats have been fitted with antennas to which either Handie-Talkie radiophones or a regular mobile transmitter-receiver can be connected.

Addition of more portable and mobile radios has helped change the radio usage to a more local character. And, although the central system dispatcher at Medford still uses the radio for fast point-to-point contact, the bulk of messages now is directed to local service trucks and maintenance crews. Equipping the service vehicles with two-way radio has speeded customer calls greatly. This is important to a power company's public relations program.

Equally important, two-way mobile radio has been a big factor in freeing key men from their desks, while permitting them to keep in touch when they are out of the office. Vice-president and General Manager J. C. Boyle, and Production Superintendent P. G. Humphreys, as well as the author, have mobile units in their company cars. Most of the district superintendents use radio-equipped cars also and have learned to depend on radio contact with their offices.

Each district differs in the number of radio units assigned, ranging from the 11 service trucks and superintendent at Klamath Falls down to a base and two mobiles at Alturas and Lakeview. In addition, each district keeps two battery-powered portable radiophones handy for whatever emergency uses that may come up.

The local base stations, in addition to dispatching of customer service trucks, double as communication centers for line patrol and construction vehicles in the area. Every radio in the two-state system operates on the common frequency of 37.58 mc FM, so that any truck, car, Sno-Cat, helicopter or survey party is always tuned to the Copco channel, no matter in which district it is operating.

Maintenance of all communications equipment is done in Copco's well-equipped shop at Medford. The newer mobile units are interchangeable between 6- and 12-v ignition systems, using all-vibrator power supplies and are rated at 50- to 60-w output.

Choice of the 37-mc frequency has worked out particularly well for the utility because of the hilly, wooded terrain and the relatively long distances between stations. Five of the 14 base stations are locally controlled, that is, transmitter and receiver are located at the dispatch office. The other nine bases are remote-control stations, situated from half a mile to as far as 12 miles away from the dispatcher. Remote stations are utilized wherever there is extra antenna height to be gained. Higher antennas give the stations wider coverage.

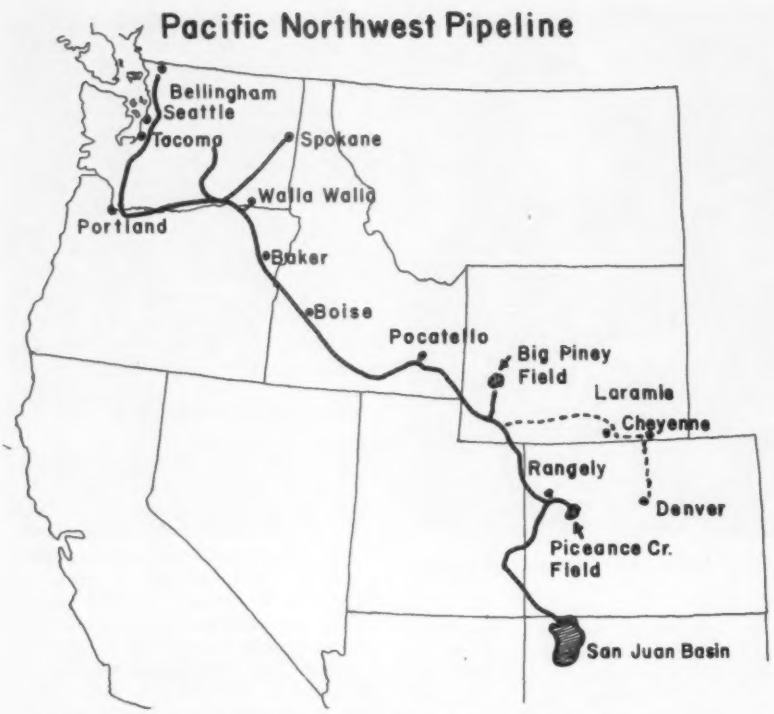
For remote locations the company has standardized on 70-ft wood poles for antenna mounting. Radio equipment is housed in weathertight concrete buildings at the foot of the poles. The remote stations are operated from a-c power lines, but in case of power failure the equipment is switched automatically to gasoline-driven stand-by generators. When a station goes on emergency power, a "beep" tone is imposed on the control line to alert the operator.

Some districts are fortunate enough to have a mountain handy for high base station antenna elevation. Medford is an excellent example. Here Copco's quarter-kilowatt base station is located 12 miles east of town on Roxy Ann Mountain, a 3,460-ft butte, shared with several other stations. The transmitter can be remotely controlled from either the Medford district operating center downtown or from Lone Pine, the system dispatching headquarters located on the eastern outskirts of town.

Two-way radio and company-owned telephone lines are being displaced by power line carrier as the primary medium of communications for load dispatching. Copco was among the first utility companies to install automatic simplex carrier, using it to link Medford with Dixonville, via Prospect. Another circuit extends north from Dixonville to Alvey, where Copco lines interconnect with the Bonneville Power Administration. A third power line carrier spur from Dixonville 40 miles eastward to Toketee Falls extends the Medford dispatcher's control to the newest generating facilities on the North Umpqua. A fourth carrier installation links the Copco and the Pacific Gas and Electric Co. communication systems. On order is another carrier output for use between Medford and Dixonville on an alternate route, by way of Grants Pass.

Full development of the California Oregon Power Co.'s carrier communications will likely be spread over several years. At present, the carrier circuits handle a considerable volume of administrative traffic, which necessitates continued use of VHF radio for occasional switching and load information.

The utility's experience is proving that local service dispatching and system load dispatching can share a two-way radio channel compatibly during the gradual change-over in point-to-point communications.



Northwest natural gas line. Approximate deliveries per day for the first year in mcf are: Bellingham 1,400; LaGrande 880; Cascade Natural Gas Corp. (9 cities) 27,459; Colorado Interstate Gas Co. 100,000; Seattle 42,800; Spokane 20,000; The Dalles 700; Longview-Kelso 7,567; Camas-Washougal 14,200; Centralia-Chehalis 490; Evrett 840; Tacoma-Olympia 5,050; Wenatchee 888; Pocotello and Payette 3,200; Portland 25,000; Idaho Natural Gas Co. (27 cities) 41,660. For equivalent kilowatts multiply above figures by 12

Northwest will feel the

Impact of Natural Gas

As spring of 1956 and the delivery date of natural gas in the Pacific Northwest approaches, speculation increases as to the impact on the economy of that region. Many feel that natural gas will usher in a new era of growth and prosperity; that to have a competitively priced fuel placed under the economy of the region cannot help but have a healthy and beneficial effect.

Few realize the tremendous daily amount of heat energy that the pipe line from San Juan Basin will deliver to the Northwest, even electrical men who may be the ones most directly affected. On a thermal basis, assuming 300,000,000 cu ft as the daily capacity, the line will be the equivalent of seven 345-kv transmission lines delivering 3,600,000 kw 24 hours a day or 86,400,000 kwh.

The accompanying map shows approximate initial daily deliveries of gas to cities of the Northwest. The Federal Power Commission recently authorized the Pacific Northwest Pipeline Corp. to import 303,000,000 cu ft of gas a day from Canada. This is the equivalent of another 3,600,000-plus kw. The energy capacity of the two pipe lines, if it is additive, is 7,200,000 kw, electrically speaking, or approximately the equal of all generating plants in the Northwest combined.

Blessing in Disguise

Considered in this light, many feel that natural gas will be a blessing in disguise for the perennially power-short Northwest, particularly in view of the fact that most of the low-cost hydro sites in the area have already been developed and the outlook is for higher-cost power. Moreover, the prospect is for less federal subsidy of electric power, which means a more realistic pricing of electrical energy in the future.

River runoff and storage facilities in the region are such that there is a large block of secondary hydro power to take into consideration. There are some 700,000 kw of such power sold on interruptible basis. Even before it was known that there would be two oil refineries in Washington and before natural gas was a certainty, there was a great deal of thought given to steam generation to firm up this secondary hydro.

Changing Economics

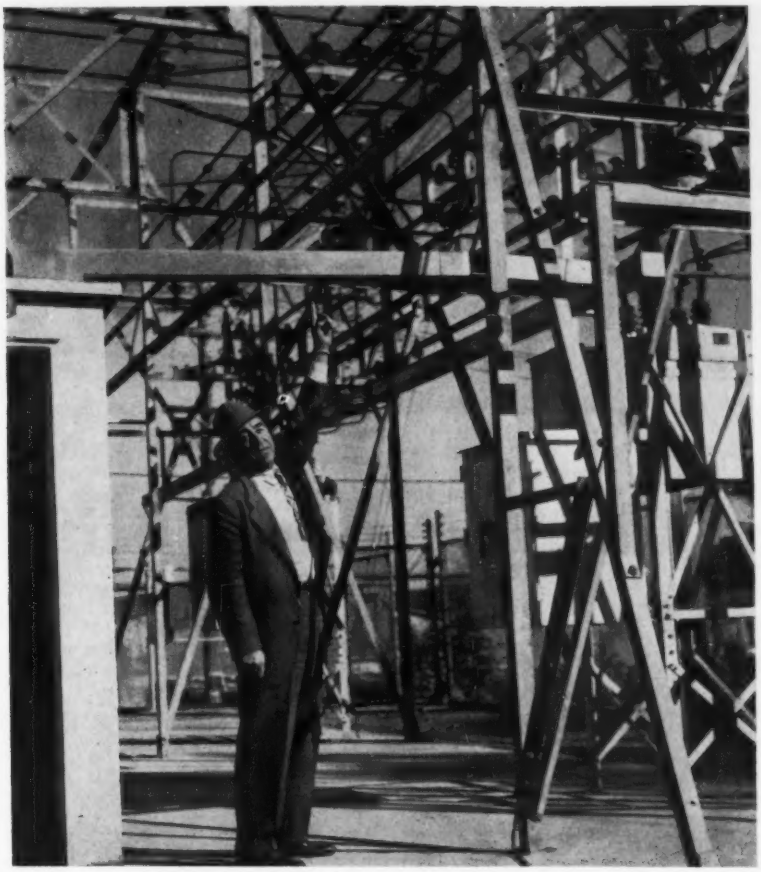
Oil and gas now change that economic picture considerably. With Bonneville power now costing 4 mills at 50% annual load factor and the prospect of a 25% increase at the time of the next rate review, which would change the 4 mills to 5 mills, the day of large block thermal generation at 5 to 6 mills may not be far away.

Where steam plant operation using natural gas as a fuel can be integrated with a long natural gas pipe line and hydro generation, as is done in California, the lowest possible cost of electrical energy is obtained. With only slightly different energy costs from oil, natural gas and hydro, the Northwest will soon have the same situation that exists in California. To the electric generating agencies of the Northwest, the economic possibilities are quite intriguing.

Picture Not All Black

A California utility man remarked: "The further you are away from the Northwest the less you are inclined to become too concerned over the effect of natural gas on the electric utilities of that region. That there will be keen competition between the gas and the electric salesmen is perfectly obvious. I have no doubt, however, with the electric fence mending I understand is going on up there that the electrical utilities won't be hurt too badly.

"There is no reason to believe that the rate of load growth there will decline materially under the new conditions. Electric utilities in California have competition from low-cost natural gas and their electric rates are higher, yet these utilities as well as others in the West, where the same conditions exist, show greater rates of load growth than do the Northwest utilities. New industries, commercial development, increased population and greater usage per customer are the more important factors. There is a lot of truth in the old saying, 'it's an ill wind that blows no good.' "



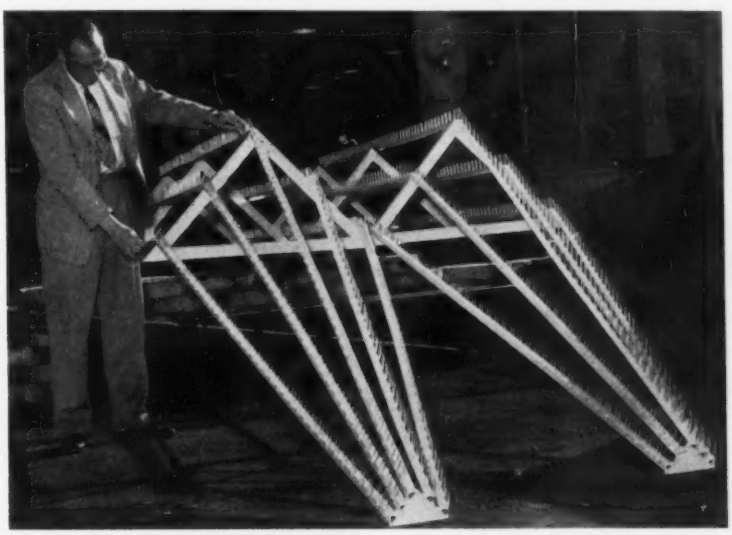
Overhead gutter for control wiring instead of underground conduit effects large savings

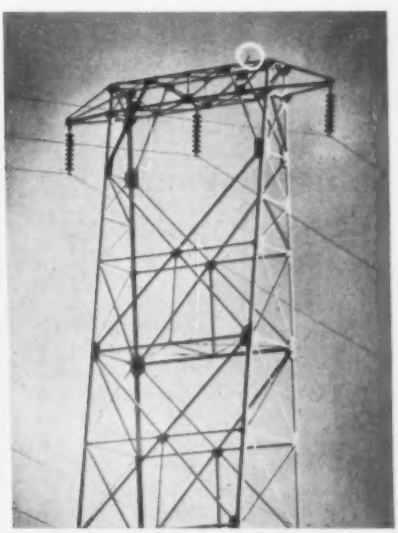
Wire Gutter Saves $2,000

Use of the control wire gutter shown instead of conduit buried in the concrete pad is an innovation by Puget Sound Power & Light Co. that effected a saving of $2,000 on a substation built recently. Rollo Johnson, superintendent of the southern division, originated the idea in an effort to reduce the cost of the "standard substation."

The wiring gutter, made of 4x4-in., 16-gage sheet steel in 10-ft lengths, runs from the control house to equipment on the rack. The gutter has side openings throughout its length; one side consists of 5-ft panels fitted with handles for safety and with offset edges for overlapping of joints to keep out moisture.

The gutter does away with the costly work of cutting, bending and fitting of conduit and of providing spares. Without conduit in the slab the work is simplified. All concrete is poured at one time and the breakdown of work falls into just three operations: the preparation of the ground and footings; fabrication of steel structures; and the installation of equipment and wiring. Puget Power's engineering department now has made the wiring gutter a standard system design feature for new substations.





Favorite dining place of seagulls feeding on clams, shells and algae has been the tops of the eight 100-ft steel towers carrying transmission lines of Tacoma City Light across Puget Sound at Henderson and North Bays. Engineers, fearing that the salt in the gulls' diet would rust the steel, necessitating eventual replacement of the cage section of the towers, sought a means of changing the birds habits. Solution is expected to be the bird barriers shown, consisting of angle irons from which project U-shaped wire staples

Corks of the floating electric fence trace the way to two traps used in tests. Traps are seen in face of the dam in right photograph

Salmon May Get "Ski Jump" Exit

Artificial spawning areas and a "ski jump" type of chute in dams may lead the way to peaceful coexistence of the salmon and electric power industries in the Pacific Northwest.

The International Pacific Salmon Commission, Washington State Fisheries Department, U. S. Army Engineers and Puget Sound Power & Light Co. have teamed their interests and resources to experiment at Puget Power's Baker River Dam for the past three years.

Results of their work at the present time point to artificial spawning areas behind the dam, electric "fences" to guide fingerlings to a ski-jump slide with a positive overflow from the reservoir, a fall "like leaves" to a deep pool far below and normal progress on to the ocean. Spawning areas would be restocked annually.

The electrical fence guiding the fingerlings to the proper place in the dam consists of two parallel wires floated by corks. From the two floating wires, others are attached at 2-ft intervals to hang down into the water to a depth of 50 ft. The fence is charged with 90-v d-c from a 50-kw generator, with one set of wires having a positive charge and the other a negative.

Current passing between the two sets of wires nudges the fingerlings along in the right direction, where they will find the ski jump, a long fall that airplane drop tests show they can survive, and then freedom.

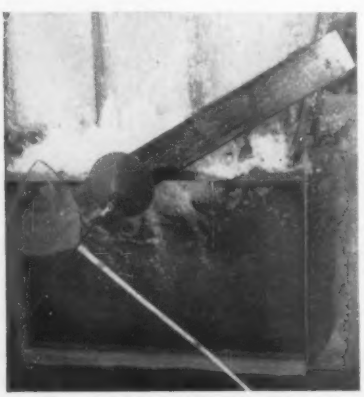
This year the fingerlings go into traps in the dam instead of the slide in order to test the effectiveness of the fence. Reports are that the fence has proved to be very effective.

The fingerlings were taken from the traps in "live" boxes, given identifying tattoo marks, released and their progress checked as they emerged below the dam.

Another test of the system was to dump 1,000 fingerlings into the deep pool and then trap them for a count downstream to ascertain whether they were leaving the pool. They do leave the pool.

Tests on the artificial spawning areas are now under way with 100 adult sockeye salmon in artificial pools. They will remain there until they spawn and die, and fishery personnel will check the results of this phase of the experimental program.

Decision to install the fish chute followed earlier studies, involving 74,000 fingerlings over a period of three years, that indicated fish could survive the trip through a turbine without much trouble but were often dashed to death against the face of the dam. It was also learned that few fish would sound deep enough to enter a tunnel 75 ft below normal lake level, unless the spillway was closed for several days.



Interior view of trap used to capture salmon

Fingerlings are released in deep pool below

Another count taken downstream from pool

Persistency won out finally and

I Saw Russia's Atomic Plant

"I saw Russia's atomic power plant," said Robert R. Gros, vice-president of Pacific Gas and Electric Co., to an editor of ELECTRICAL WEST upon his recent return from a trip behind the Iron Curtain. "The Soviets really do have an atomic power plant," he said, "and by an interesting chain of events I got to inspect it in some detail.

"I'll tell you what I saw, but that is getting ahead of my story. I must first tell you the interesting circumstances under which I visited Russia in the first place.

"Last spring I was appointed by San Francisco's mayor as chairman of the citizens committee for the recent United Nations tenth anniversary commemorative session in San Francisco. As such I frequently met Mr. Molotov and his party, as well as delegations representing other member nations.

"During the week of the UN sessions there were many receptions and cocktail parties. Every time I saw Molotov he gave with a platitudinous rhetorical sort of invitation 'you must come visit the USSR some day.'

Invitation Genuine

"Over vodka cocktails there had been a great deal of straight-faced needling between us over capitalism and communism but he always repeated the invitation. I had no illusions about his sincerity but the day before he left I decided to take him up. To my utter amazement he called over his ambassador to America and told him to visa me whenever I wished.

"Well, that's how I got to Russia," said Gros. "I must say that I was cordially greeted and permitted to see many things that I wanted to see—save one thing—the atomic-powered electric generating plant they boast about.

"I was shown their collective farms, factories, large commercial building construction and many other interesting things. I talked to their people. But, I kept asking, when are you going to let me see your atomic power plant?

"All through this I discovered that a small snapshot of Molotov and me toasting everybody and everything over the vodka made more of an impression and got me more attention and places than did my visa. But still I did not get to see the atomic power plant. Always that 'nyet.'

"Finally at a formal meeting I sensed that the time was right so popped the $64,000 question. An obviously startled Molotov said, 'That would be difficult.' Molotov wasn't enthusiastic about the idea but motioned to Malenkov. Malenkov told Molotov that I had talked to him about it and said, 'You know he is the president of the largest utility in the United States and I suppose that is why he wants to see our great atomic plant.' Molotov repeated my Russian acquired promoted status and I saw no reason for arguing, feeling that my boss would hear it from me and get a chuckle out of my usurpation. After many treatments of 'we shall see,' they said I could see their atomic power plant!

Tried to Confuse Me

"At the appointed time the next day we started out. They took this way and that way through the streets of Moscow and into the countryside. I had the very distinct feeling that they were taking me around in circles deliberately to confuse me so I wouldn't know where the plant really was located. This lasted for two and a half hours. I would judge from my Boy Scout sense of directions that the plant is located about 60 miles southwest of Moscow and could have been reached in half the time.

"The plant is situated in a beautiful forest within a high fenced, well guarded enclosure. Here finally was the atomic power plant! I am not an engineer but I made careful mental notes of major features.

"The reactor furnishes steam to drive a 5,000-kw turbine-generator. The reactor consists of a graphite cylinder with 128 4-in.-diameter channels where fuel elements are burned. The reactor burns 30 grams of uranium 238 per day. By means of a heat exchanger the heat in the coolant generates steam for operation of a conventional steam turbine located in a separate building 30 yd away. Control and instrumentation are amazingly complex. I was surprised to find that the plant is being operated by a group of young technicians whose age average is about 25. Not being an engineer this is, of course, a rather sketchy description of the atomic power plant."

Gros was asked for some general observations. "With Russia's tremendous building program, the shoddiness of construction is unbelievable. I saw buildings, including those of 8 to 10 floors, that contained not one iota of steel, either reinforcing or structural. I saw two buildings where, with the top floor unfinished, the external plaster on the first floor was already chipping away.

"The Moscow subway is something New York would be delighted to have but the Russians have gone to the most absurd extremes in the subway stations. Not one is as unpretentious as one of our hotel ballrooms.

"I saw a truck factory with 15,000 employees but it was a filthy pig pen, with no sanitation and no safety devices to protect the workers. Efficiency is not the criterion. The Soviet Union is a sterile state of adequacy, adequacy alone. Marx was no advocate of the good life but the goods of life.

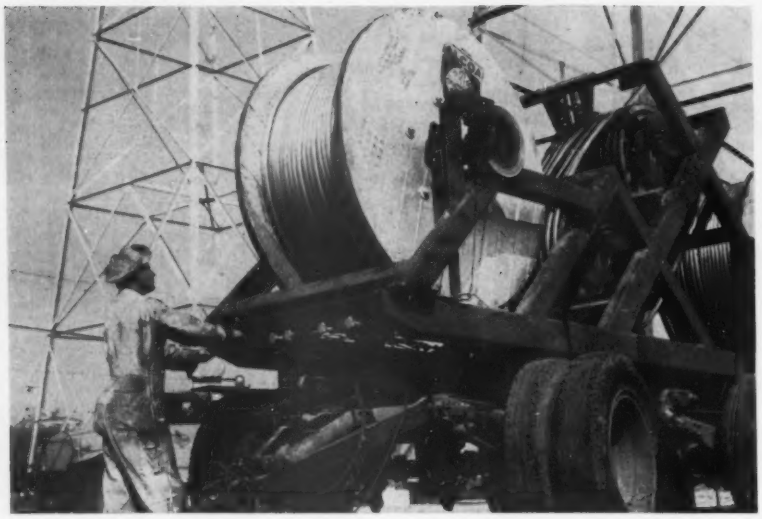
"It is a planned state, with all the horror of bureaucracy. You order your breakfast and you wait 20 minutes for your fruit, 40 minutes more for your eggs. If you forget to ask for bread and butter, you wait another 20 minutes. If you go out to the kitchen to find out why, you will find the waiter filling out reports. Every grain of butter and bread is weighed before it is brought to you. There is no private field except for an occasional farmers' surplus at the free market. Prices are changed to control consumption.

Everything for the Military

"Certainly they were 40 years behind us in everything except electronics and the use of nuclear fuel. Yet our greatest danger is for us to underestimate them. We said it would take a decade for them to get the atomic bomb and they had it fearfully soon after we did. We said they would never have nuclear energy. They either beat us or tied us.

"When you see no steel in their buildings it is because they are siphoning off the steel and industrial capacity for the military. There is material progress in the Soviet Union, plenty of evidence, but at horrible cost in human misery and degradation.

"No man could return from what I have seen without an even greater feeling of respect and appreciation for the rightness and worth-whileness of our system of life and form of government here in America."



Tension stringing kept ACSR conductors off ground and eliminated many guard structures

Tension Stringing Cuts Costs

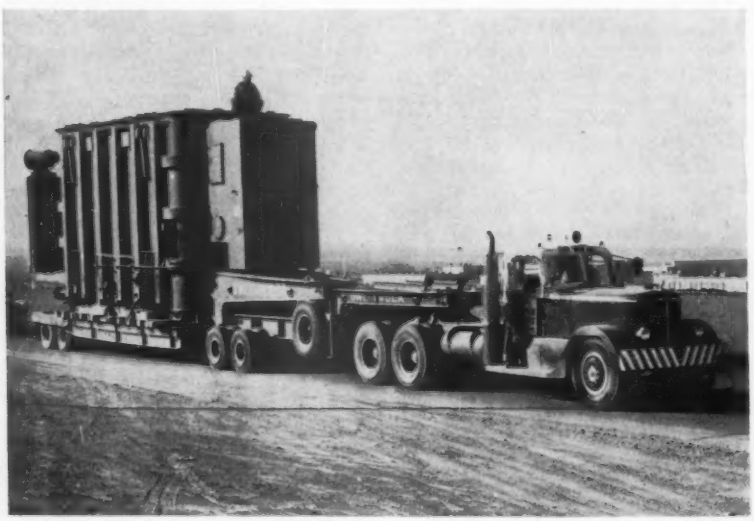
Completion of the tension stringing of the new 220-kv transmission line by the Bechtel Corp. for the Southern California Edison Co., described on p 78 of the November issue of ELECTRICAL WEST, developed the fact that construction costs were very substantially reduced over comparable work.

The stringing cost reduction was largely attributable to the use of two Pengo tension stringing machines purchased especially for the job, according to O. N. Kulberg, chief construction engineer of the Edison company. Efficient organizing and execution of the work by Bechtel crews was a further contributing factor.

Conductor on the 17-mile line was grease-impregnated, 1,033,500-cir-mil ACSR. Because of the necessity of keeping the conductor off the ground during stringing it was decided to employ the new tension stringing technique. For the greater part of its length, the line passes through the Los Angeles metropolitan area with numerous crossings of streets, highways and lower-voltage circuits of all kinds, as described in the previous article. Reduction in stringing costs came about principally through the elimination of many of the guard structures that otherwise would have been required.

Braking on the tension stringing machines was so smooth and positive that no difficulty was experienced in holding tension in the conductors varying from 3,500 to 7,000 lb.

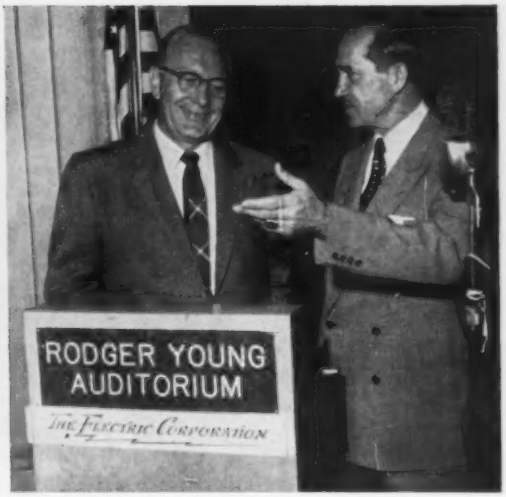
Because of the great interest in tension stringing of aluminum conductors for both transmission and distribution, Edison's experience on this job has been recited for the benefit of others.



Installation of large autotransformer and new 230-kv transmission line are being rushed to meet skyrocketing loads at Las Vegas

New Steam Power Supply

Deliveries of a 289,000-lb, three-phase autotransformer to the Southern Nevada Power Co. at Las Vegas and advanced construction on a five-mile, 230-kv transmission line to Henderson substation are preliminary to operation of the utility's new Clark steam station. The first unit of 44,000 kw capacity, scheduled for official operation early in February, underwent shakedown early in December and was expected to be delivering partial output by the end of the year. The autotransformer and special rail car with total weight of 476,000 lb was one of the largest shipments ever to be made by the northern route. Shipment required 20 days from the Pittsfield, Mass., plant of General Electric Co.



For gathering together 500 industry members Sid Hill, commissioner, thanked Stan Johns and Electric Corp. of Los Angeles for . . .

Aid in Launching a Code

A major contribution toward educating the electric industry with the revised Los Angeles electric code that becomes effective Jan. 1, the Electric Corp., distributor of electrical construction apparatus and supplies, sponsored a briefing session, Nov. 22.

The meeting drew a capacity crowd of 500 to Los Angeles' Rodger Young Auditorium. Included were electrical contractors with their engineers, estimators, supervisors and electricians, as well as many industrial plant maintenance and operating groups and other members of the electrical industry.

The Electric Corp. drew warm praise from Sidney F. Hill, president of Hill Electric Co. and Los Angeles Department of Building and Safety commissioner. Hill said the meeting was a major assist to the department's problem of enforcing the revised code.

The session was divided into three parts, with Hill describing the administrative provisions of the new code, and Arthur Clark, assistant chief, mechanical bureau, Department of Building and Safety, and Grover Wintz, senior electrical inspector, treating the major technical changes with the aid of slides.

Several manufacturers, whose equipment is affected by the code revisions, cooperated by setting up displays. The meeting was chairmanned by Stanley M. Johns, who recently acquired an interest in the Electric Corp. and was elected vice-president. Johns was previously district manager for Westinghouse Electric Corp. in the southern California, Arizona and southern Nevada area.

The new code is a complete revision of the city's electrical code and contains more than a thousand changes. Main emphasis in revision was on updating to account for development in electrical engineering and materials since the last revision in 1940. Another principal aim was to spell out all requirements—to be specific rather than general.

It is organized in the same way as the National Electrical Code, with the same numbering system, so as to simplify cross references.

The revised code was worked out during a period of two years by the Building and Safety Department with the cooperation of a 15-man committee representing building owners and managers, electrical contractors, electrical consulting engineers, electrical maintenance engineers, labor, the oil industry, the motion picture industry, the Los Angeles Department of Water & Power, manufacturers of electrical equipment and materials, the Chamber of Commerce and electrical associations.

The Electric Corp.'s meeting tied in with what is perhaps a unique effort being made by the Department of Building and Safety to educate contractors, manufacturers and others in advance of the code's effective date.

A major part of this educational process is being undertaken with the cooperation of the city school system. As part of the adult education program, 22 classes are currently being conducted by Building and Safety Department inspectors. NECA has cooperated by making available to students books reproducing the slides that are a major part of the teaching.

In addition to these public classes, the Electric League, EMEA and other groups are holding private classes for their members.

Building and Safety officials speak highly of the wholehearted support of industry in revising the code and in publicizing the revisions.

Here are a few samples of the kinds of changes in the new code:

To allow for the increased use of home appliances, the code calls for a considerable increase in residential wiring.

A main disconnect switch is required for each set of service entrance conductors.

National Electrical Code recommendations for grounding of equipment have been made mandatory. So have nontamperable fuses.

Grounding of three-wire receptacles in dwellings is required.

In commercial occupancies, it has been spelled out exactly what constitutes "long-continued loads."

Many minimum wattage regulations have been raised to permit the higher wattages required by new plants in the Los Angeles area.

Low-voltage relay switching and signal systems, not dealt with at all in the previous Los Angeles code, are covered in this one.

Electricity's Role in The new Los Angeles MORMON TEMPLE

Tower and angel are spotlighted all night; lighted grilles define the architecture

To fulfill the needs of a large and growing membership in southern California and to provide them with an opportunity for temple work, the Church of Jesus Christ of Latter Day Saints has completed a new temple of outstanding architectural features in Los Angeles.

The temple takes a commanding position in a center of facilities for activities of the Mormon church, which also includes an office and information building as well as a local ward building on a hilltop area of 25 acres. The temple faces on Santa Monica Boulevard at Overland Street. With its 259-ft tower, which includes the figure of the Angel Moroni, it can be seen by a large proportion of the western section of Los Angeles. Floodlighted at night, both the temple and the tower are an outstanding architectural monument in that area of the city.

The design of the temple was by Edward O. Anderson, the church's architect. Preliminary electrical engineering for the building and the adjacent heating plant and information building was by Louis Gawan of Salt Lake City. During construction it was continued by Henry Simons of Long Beach. Electrical contractor, who made the installation, was Jerry S. Jacobs, J. S. Jacobs Co. of Long Beach.

Electrically, the group of buildings contains many interesting features. Both for exterior floodlighting and for the individual lighting effects in the halls within the temple, many unusual lighting techniques were employed. Because of the area served the electric distribution system, likewise, required many unusual treatments.

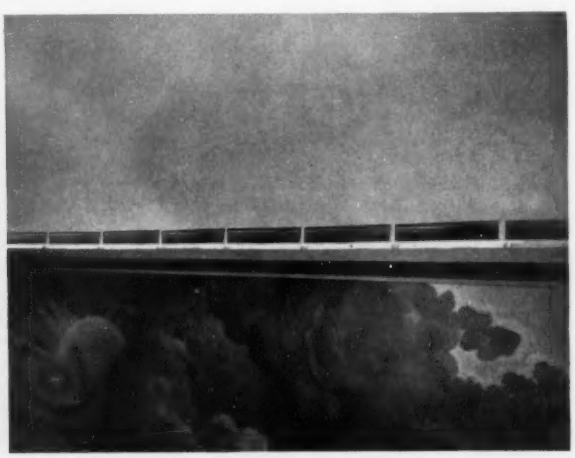
Power is bought from the Department of Water & Power at the primary and metered there at 4,800 v. The main feed comes in 4-in. conduit from the bureau's vault across the street to the bureau metering and service facilities and then through G&W cutouts into the power centers. This serves two Westinghouse Inerteen power centers of 500 kva each, 4,800/208/120 Y, 60 cycle, three phase, four wire. A G&W oil fuse cutout bank protects the primary. The power centers are tied together through a system of key interlocks.

All breakers are of the plastic-case type with 600-amp frames, although smaller trip units are used. Feeders between the switchboard and the power centers are Westinghouse bus duct, 2,000 amp capacity.

There are 16 distribution centers throughout the building and adjacent buildings, all on 120/208, three phase, four wire; and a total of 52 panels from the 16 distribution centers. Thirteen are off of an emergency system.

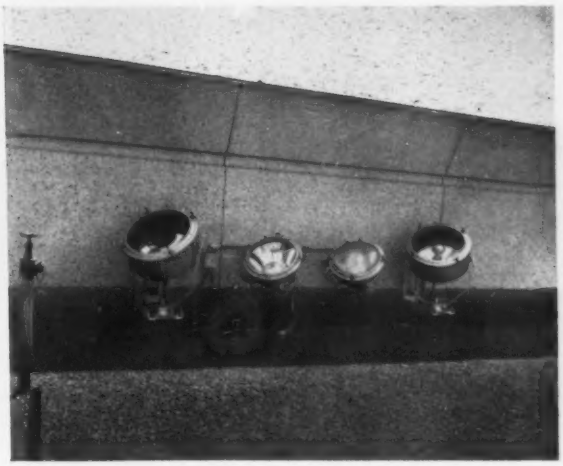
The emergency lighting system is a separate three-wire, 120/240 single-phase system and is connected by an automatic transfer switch, as well as to the main power system. This comes

All ballasts are mounted in remote banks for silence and servicing



Coves above murals hide fluorescent lamps and ventilating grilles

Slimlines along each side illuminate the exterior window grilles



Batteries of spotlights with controlled beam light the 259-ft tower

from a separate outside source of class A emergency system under the Los Angeles code.

Because of the 259-ft height of the tower, which includes the statue, obstruction red lights were not necessary under an approval of the CAA as long as an alternate floodlighting system is employed every night. To do this 20 1,000-w Crouse-Hinds spots and searchlights of narrow beam and floodlighting patterns cover the tower and the figure of the angel.

A combination of units was used in order to get even distribution the full length of the tower. The combination consists of one type DCE 18 in. diameter, one type DCY 18 in. diameter and three types ADE 16 in. diameter at each of five aiming locations. The beam candlepower of these units with mogul base lamps is 2,000,000.

The lower portion of the building is not floodlighted but relies on a street-lighting system of 54 units around the building and grounds and the long illuminated window grilles. The window lighting has been made effective by use of slimline continuous tubes at sides between the back of the grille and exterior side of the window.

The street lighting is on a separate series system from separate transformers in the substation. Additional stair and garden lighting is fed from the low-voltage interior system.

To control the tower and exterior lighting, photocell units are located on the roof. Using Square D time-delay relays and a time clock, part of the lighting is cut out at midnight and the photocell-operated relays cut off the rest at daylight. Because relatively high lighting loads are used on each outdoor section the timing section is incorporated to step the division of load at 10-second intervals.

The other buildings are fed separately from their own substation, which itself is fed by 4,800-v feeders from the main substation. The motor load in the utility building is carried at 440 v, three phase, and the lighting at 120/208, four wire.

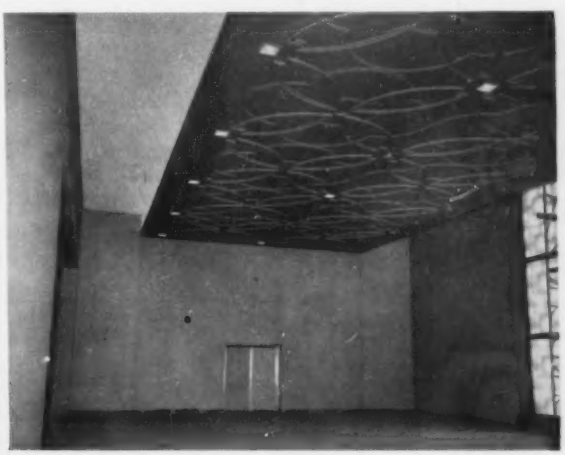
Before the site was cleared and construction began, all utility lines were put underground, including telephone and power. This gives a clear view around the entire building.

Interior Lighting

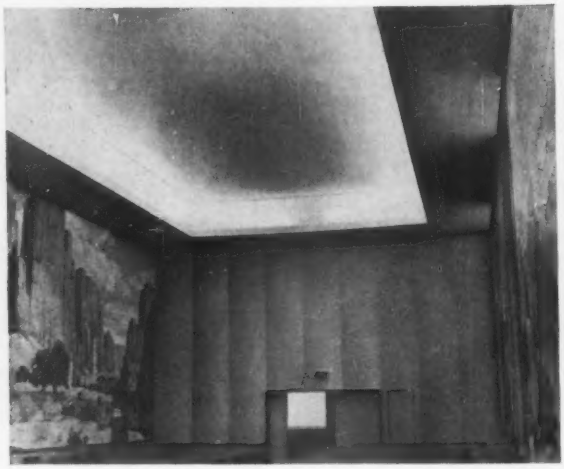
Within the temple building are a number of ordinance halls and a baptistry. There are also dressing rooms for men and women on opposite sides, a main kitchen and a children's kitchen, dining rooms and reception halls, lecture rooms, etc. On the walls of the ordinance halls are beautiful painted murals representing scenes used in temple ordinances.

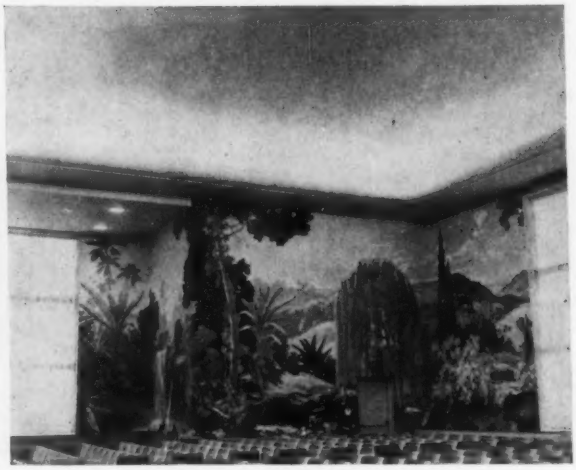
The lighting of these areas is done by a variety of means. In some halls there are coves in which fluorescent

Combination of lensed down lights and cove used in largest hall



Cove along dropped ceiling and downlight units in another room





Perimeter cove lighting with fluorescent lamps provides a "sky" of light that gives ideal distribution over murals in ordinance rooms

strips are hidden alongside of ventilating ducts, likewise hidden, to direct a soft illumination over a domed ceiling. In others, dropped ceilings contain coves at their edges that direct the light downward along the walls and over the murals. Spots and floods are often mounted in the ceiling to direct light to particular scenes. A great deal of fluorescent and slimline lighting is employed in the coves, using either Day-Brite or Sunbeam strips. As an aid to servicing the fluorescent lighting and to remove possible noise, all ballasts are placed remotely.

Along the corridors and in many public areas recessed Day-Brite fixtures use Holophane lenses for distribution and diffusion.

Special ornamental fixtures were designed for use in the main stair well and for the entrance stairway and in some of the ordinance rooms. These were done by Wagner Woodruff to designs by the architect. Strickley Co. also furnished some special fixtures, as well as did Century. There are also Columbia and Smoot-Holman fixtures in various places.

All Electric Kitchen

An all-electric kitchen is one of the electrical features. It serves an adjacent dining hall. The kitchen contains three Hotpoint electric ranges, 22 kw each, and a two-bank Hotpoint 12-kw oven. Likewise, there are an electric dishwasher, two garbage disposals, vegetable peelers, plate-warming cabinets, steam tables, a Hobart mixer and two large walk-in refrigerators, as well as undercounter refrigerators and a large freezer and various types of coolers. Lighting of the kitchen is better than ordinary with Holophane lensed units in two rows and around the ends of the kitchen. An electric steam booster of 28 kw capacity is used with the kitchen dishwasher. Similarly, the children's kitchen is all-electric.

Extensive ventilating and air conditioning equipment is provided for the temple. Likewise, there are three Otis elevators to reach the building's six floor levels.

Sound equipment is provided in various areas. Several rooms use stereophonic sound. The entire building will be wired for sound for the dedication ceremonies.

Dedication of the temple will be held some time after the first of this year, after a two-month period of public inspection by invitation of members to their friends.

Jerry Jacobs, contractor, and his foreman, Harry Moorehead, in the main substation and transformer vault with 500-kva power center

Distribution from the substation to other centers utilizes 2,000-amp ventilated bus duct along the basement ceiling of the main building

ELECTRICAL WEST

Contractors' News Letter

QUICK NEWS ON TRENDS, LAWS, CODES, MATERIALS, EQUIPMENT, COSTS, WAGES, ETC.

Do it yourself

At this time of year, predictions pour down from every quarter like the rains that have inundated Oregon and California. This does not infer that they are all wet but does provide our excuse for not adding to the flood. If you want predictions you can read them in every paper and magazine. Some are booming and others have a note of caution. You take your own pick. Only what can be soaked up at the local level, either of water or boom prosperity, interests most electrical contractors.

Settle down

Prices of electrical materials have just about absorbed the increases in copper, steel and wages. Last to raise has been pole line hardware. Tremendous production pressure on manufacturers passed on down the line is likely to keep prices from going up much more unless metal or wages take another rise.

Cleaned out

Westinghouse strike has cleaned out inventories of Wesco's company-made merchandise and supplies. No end was in sight at press time. Westinghouse opened its patents on circuit breakers to G-E in order to protect customers hurt by the strike against Westinghouse.

Up the scale

Wage rates for journeymen electricians, foremen, etc., go up in the San Francisco Bay area Jan. 1. Scales for San Francisco, San Mateo and peninsula, and Contra Costa County go to $3.225 per hour plus 1% IBEW pension, 4% vacation and 7½c health and welfare. Oakland remains at $3.12 plus the same fringes because of a council case. Stockton rate of $3 is up for renegotiation.

Flooded relief

Relaxation of FHA credit restrictions was announced by Commissioner Norman P. Mason for those who lost their homes in the flooded areas of California and Nevada. A special FHA representative, M. Joseph Cassidy, came from Washington to San Francisco to arrange long-range private financing for permanent homes to replace those lost. Consideration to flood victims unable to meet mortgage payments was also announced.

Fatal gift

A "Do It Yourself" tragedy—A chemist of the Cutter Laboratories in Berkeley was electrocuted in his kitchen while installing a garbage disposal that he was giving to his wife as a Christmas present. He was reported to have come in between a live circuit and a water pipe in the kitchen.

Promotion plan

Santa Barbara will have a big adequate wiring promotion meeting and electrical equipment show Feb. 17. The location had not yet been announced but the show is designed to show architects, engineers, general contractors, builders and electrical contractors modern electrical equipment for the home. They will be issued invitations to attend. Harry V. Dobson, former city electrical inspector, now consultant, has been named chairman of the committee, which includes Bob Murphy, contractor, Jack Winstrom, Goleta Electric, Glen Anthony, Southern California Edison Co., Mr. Raber of Raber Electric Supply, Matt Gallagher, NECA chapter manager, and Dave Milne, IBEW local business manager.

Gets final

Ray E. Colby, chief city electrical inspector of Fresno, died of heart attack Dec. 24. Only a few days previously he had okayed the story on the new Fresno electrical ordinance (see p 75), which had climaxed his career as an inspector since 1947 and prior to that an electrical contractor.

Leader

Another life-long friend of the electrical contractor, H. H. "Kelly" Courtright, had died on the 20th in Fresno. Colby had just written a letter to Herb Ufer of Courtright's death on Dec. 22. As manager of Valley Electrical Supply Co., which he joined in 1912 as a fixture salesman, "Kelly" Courtright ran the contracting division of that company, which did wiring until the 1930s. Courtright was always a leader for better standards and more salesmanship in the contracting field.

Watch for it

A new and different low-voltage remote control system for residential lighting will soon be announced by Pyramid Instrument Co., maker of capacitors and rectifiers. No further details are available.

Big switch

Square D Co. and Electric Controller Mfg. Co. have merged and the Electric Controller will operate as a separate division. This makes Square D one of the nation's largest manufacturers of electrical distribution and control equipment. Electric Controller's products are of the heavy type for motors, electromagnets, magnetic brakes. Square D produces control devices for commercial and residential use.

Double value

A new Plug-In Strip, which contains not only receptacles but an extra wiring raceway to serve additional circuits, has been announced by National Electric Products Corp. of Pittsburgh. It accommodates both the standard and grounding outlets and the wiring channel allows three No. 10 conductors to be carried below the receptacle strip. Underwriters' Laboratories has given it exhaustive pull tests and will list it. The additional conductors may be wired for either three phase or single phase. Designed primarily for commercial and industrial applications, the strip will be particularly adaptable to air conditioning unit installations and may later find residential use as well. It could be used in rewiring to eliminate fishing of runs through walls or partitions.

Claims jurisdiction

In a strongly worded letter to electrical contractors in Contra Costa County in California Thomas J. Ryan, business manager, local 302, IBEW, claims jurisdiction for the installation of all built-in electrical accessory appliances such as ranges, separate ovens, dishwashers, laundry equipment, special heaters, refrigerators and ventilating units. It also claims jurisdiction over handling of the equipment from its first point of delivery on the job, including the uncrating, inspection and installation.

Small and silent

Now the Quiette switch has been made available by Arrow-Hart & Hegeman Electric Co. as an interchangeable 20-amp device. Thus it can be ganged three to a switch outlet box the same as the other interchangeable switches have been in the past . . . Arrow also announces some new two-wire and three-wire grounding-type receptacles with parallel slots for 125 v, tandem slots for 250 v.

More power

"Housepower" may well replace "Adequate Wiring" as the designation and slogan for the residential wiring program. Edison Electric Institute is launching a huge advertising campaign promoting residential wiring, using the catchy idea of "House Power" as a new approach.

New crews

New officers were elected in several NECA chapters last month. Big Los Angeles Chapter elected Andrew L. Hannon, Hannon Engineering Co., as its president to succeed Charles A. Wikle, Schulman Electric Co., who was named governor. A. L. Berg was named vice-president and J. B. Shamel, California Electric Co., treasurer. Directors include the officers and Cliff D. Allen of Pasadena, Richard E. Arbogast, Lewis Barth and Sidney F. Hill of Los Angeles, Stanley R. Brekhus, San Bernardino, Anthony Carbone, Wilmington, Oscar Chagnon, Baldwin Park, Robert J. MacFarlane, Santa Ana, Hugh E. Tanne, Long Beach, Harry R. Vancott, and Chauncey W. Voorhies, Riverside. Warren Penn is executive vice-president and manager of the chapter . . . The Santa Clara-San Benito Counties Chapter at San Jose elected James Sardella as president, succeeding Joe Santora Jr. who became governor. Other officers are Paul Leslie, vice-president, Kelvin Young secretary-treasurer and directors are Irving Butcher, Leon Hayes, Ernest Kesling, J. A. Puccinelli and Ray Rosendin . . . Northern California Chapter had branch elections. Harold Pierce of Pierce Electric Co., Vallejo, and Art Tockey, Napa Electric Co., were elected chairman and vice-chairman of the Solano-Napa Counties Branch. Andy Maser was elected chairman and Chet Brunelle vice-chairman of the Contra Costa Branch. Alameda County Branch elected George Curran as chairman and Ed Hutka vice-chairman.

NECA doings

Some NECA chapter activities include these: A Modesto Division is being formed to replace the former chapter there. It will be a division of the San Joaquin Chapter, headquartered in Stockton, although it will have its own officers and operate out of Modesto. Reno Ferrero of Ferrero Electric Co., Merced, is chairman of the division and a director on the chapter board. Chapter Manager Gil Froehlick will render service as needed . . . The San Joaquin Chapter has started an estimating class with 16 enrolled. It is being conducted by Wilbur Wallace, electrical engineer, in conference style . . . The Monterey and Salinas contractors voted to affiliate with Santa Clara-San Benito Chapter, if the board of directors of the latter approves. An assistant to Chapter Manager George Harter may be required. Jim Mertz of J-M Electric Co., Salinas, was elected chairman.

Idea spreads

Bid depositories are being established in Modesto at the American Trust branch bank and a separate depository is being set up for Sonoma County in Santa Rosa. Bank of America is used as depository in both San Rafael and Santa Rosa and shortly another will be established in Eureka.

Another step

A job management course is being started at the Oakland Junior College, Merritt Campus on Grove Street, by the Northern California Chapter, NECA. The course is to be taught by Henry Tilson and is open to NECA contractors and their designated employees, superintendents, foremen and estimators. Enrollment charge is $65 and a certificate will be issued upon completion. The course consists of 40 two-hour meetings beginning Jan. 10.

Prize contest

Look Magazine is sponsoring a national contest of 1956 adequate wiring awards. They will be given to the contractors who do the best job of selling adequate wiring either in new construction or modernization. A resume of the contractor's activities and promotional advertising and a case study of jobs is required.

Copper capers

"Copper supply may improve," said the Copper & Brass Research Assn., but as it did so Chilean mines went on strike. The industry was just recovering from the long strike last year. Likewise, the demand for it keeps growing as the plumbing industry increases its use and even electrical applications are added. The Chilean strike sent the price on the world market up to new highs. It will be well to plan and estimate on a tight supply basis.

People

Some names in the news: Walter L. Stickel has set up in business for himself as manufacturers' representative for lines both electrical and electronics in the industrial fields. He is located at 1709 W. Eighth St., Los Angeles . . . B. C. West from Federal Pacific Puget Sound Area goes to San Francisco headquarters as assistant to Western Regional Manager Leonard P. Shelley . . . James G. Kirwan, Westinghouse Electric Corp. engineer, Portland, was named president of the Professional Engineers of Oregon . . . H. Ferd Koch of Electric Service Co., Boise, was elected president of the Snake River Valley Electrical Assn. and another contractor, R. Carl Young, was named its treasurer. Koch succeeds Henry H. Falkner, Wesco's supply manager in the Boise area, who was president during the initial administration . . . Henry M. Day, former Salt Lake City real estate operator and state director for FHA, resigned as assistant commissioner for operations of FHA in Washington to return to private business . . . Leonard A. Hobbs, Smoot-Holman Co., was re-elected to the board of trustees of the RLM Standards Institute recently . . . Stan Haywood of Prescolite, Berkeley, was recently transferred to the company's eastern offices to become eastern sales manager . . . Charles Dickinson, who had been Seattle division manager of the lighting division for Sylvania Electric Products, is now West Coast national accounts manager with headquarters at 215 Market St., San Francisco . . . Al Berg has been made manager of the Graybar Electric Seattle lighting department, succeeding William Creech who retired and Clarence Moon, from the Tacoma area, has been moved to Seattle in charge of the lamp department.

The grim reaper

Death called suddenly upon the veteran consulting electrical engineer, Thomas B. Hunter, of San Francisco Dec. 27. He was 75 and had engineered electrical and mechanical work for many University of California and Stanford buildings, the Shell building, San Francisco, and others . . . Double tragedy struck two contractors and their wives from Seattle in the bombed airliner from Denver Nov. 1. One of them was B. H. Beckstrom of Lake City, owner of Beckstrom Electric Co. and Strombeck Electric Co. in Fairbanks, Alaska.

Heavy meters

A new heavy-duty socket box or enclosure for use with a self-contained meter without an instrument transformer for 120/240-v single-phase loads up to 175 amp with maximums of 2-in. service raceways and 3/0 conductors has been approved by the Pacific Utilities Electric Service Requirements Coordinating Committee. New sheets illustrating the approved enclosures have been issued to the holders of the service requirements books. The boxes are made by Alwalt, Anchor, Blakeman, Duncan, General Electric, Murray, Westinghouse and Zinsco.

Too dim

An ordinance to require "Adequate Lighting" in all beer halls, taverns and places where beer is consumed was recently presented to the Salt Lake City commission at the suggestion of the LDS Stakes. As proposed, the ordinance would require an over-all intensity of 2 f-c. The meter wouldn't even register in some of the places cited in the request.

Long needed

Electrical Systems Design will be made the subject of a special treatment in the May issue of Electrical Construction & Maintenance, its editor, William Stuart, has announced. It will be the most comprehensive job of this kind ever undertaken to evaluate and to detail the variety of electrical systems possible for various applications.

Two way

Heat pump applications for year-round air conditioning will be promoted by San Diego Gas & Electric Co. in advertising to its commercial consumers. Follow up by contractors in this equipment is invited.

Dilemna

Both its president and first vice-president were lost by the International Association of Electrical Inspectors in recent moves. First Vice-president Herbert Ufer, who would be in line for president, withdrew because of a question of his eligibility since he has retired from Underwriters' Laboratories and become a consultant. The second vice-president, who would have succeeded him, E. B. Morrison of Portland, died recently. This leaves the two top positions to be filled by the executive council.

Home light

A big fixture promotion is being planned for 1956 by the American Home Lighting Institute, representing major manufacturers of home lighting fixtures. Emphasis will be on relighting of the more than 40,000,000 existing homes whereas past emphasis has been on new homes. Large advertising space in the shelter magazines at the national level will be followed with promotions with distributors at the local level. October has been named Home Lighting Fixture Month.

On band wagon

More popular magazines are getting on the band wagon to promote adequate wiring. Woman's Home Companion in the January issue has a 4-page feature, "Are You Wired for Modern Living?" . . . January's Ladies Home Journal has one on lighting, "Can You See What You're Doing?" More are in the works . . . Farm Journal had a feature full-length article on updating of farm wiring systems in its December issue.

Safety meet

Industrial Safety Conference of the State of California is being called by Gov. Goodwin J. Knight for Feb. 2 and 3 at the Fairmount Hotel, San Francisco. The construction industry section will deal with some electrical safety problems.

Golden light

Fiftieth anniversary of the Illuminating Engineering Society is being celebrated in all of the Western chapters and sections at their January meetings. The society was founded in 1906 and throughout this year will be celebrating its Golden Anniversary, making a special feature of it at the National Technical Conference. Each of the three Western regional conferences in San Francisco, Spokane and Salt Lake will likewise celebrate the 50 years of lighting progress.

New lamp

General Electric Co., in a nation-wide television hookup over closed circuits, announced what it calls the "greatest single improvement in incandescent light bulb performance in 42 years," when it introduced a new straight filament bulb design with a coiled coil. Light output increases from 6% in the smaller sizes to 15% in the larger. Those of larger sizes are available immediately and others will be brought on the market as soon as equipment can be converted.

Observance

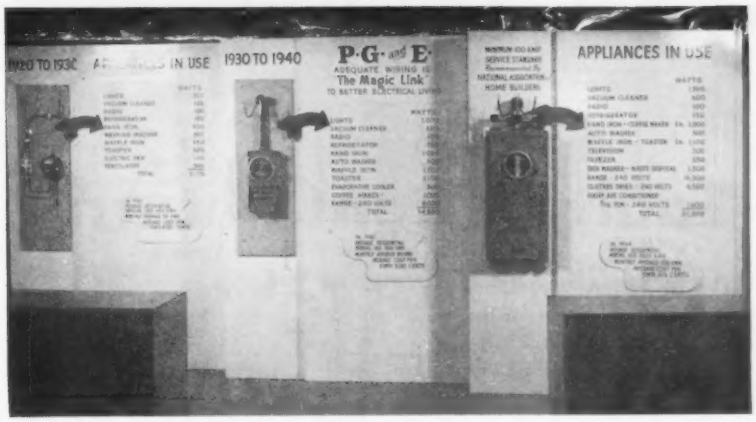
National Electrical Week, started by the International Association of Electrical Inspectors in 1953, will be celebrated annually the second week of February to coincide with the birthday week of Thomas A. Edison, born Feb. 11, 1847. N. E. Skinner of St. Louis has been appointed chairman of the National Electrical Week committee, whose purpose is to "focus attention on the contributions of electricity to our American way of life and on the contributions made toward economic strength of our country by the organizations making up the electrical industry." It also emphasizes the importance of safety through adequacy of wiring installations. Local observances of the week with special ceremonies to commemorate it are urged upon all in the electrical industry.

Simplify

Tork Clock Co. has simplified the line of single-pole time switches so that contractors can order the ones they want without going through a large number of catalogs.

Why is it profitless?

Because wholesalers' profits are not in line with their volume or with the prosperity of the manufacturing industry, the National Association of Electrical Distributors has organized a distribution research committee to find out what is missing and to improve the functions of the industry to perform at less cost, Arthur Hooper, executive director announced.



Wih this display at fairs and home shows, the public was told about the need for . . .

Fresno's New 100-Amp Code

A new pattern was set for the San Joaquin Valley of California, a highly electrified region, when Ray Colby, Fresno city electrical inspector, announced that the new electrical ordinance for that city would go into effect on Nov. 12, 1955. That the ordinance was passed without opposition bespoke the harmonious cooperation of electrical contractors, manufacturers' representatives, distributors, electric utility with the electrical inspector. Even the Fresno Home Builders Assn. and the local union and appliance dealers joined in a unanimous support.

Like most regions of the West, not much had been done to improve the minimums accepted in the city ordinances for the San Joaquin Valley despite the fact that the domestic electric customers had doubled their use every 10 years. While previous ordinances met the standards of the National Electrical Code, the minimums tended to be treated as maximums. It was as though no one read the paragraph on page six of the code frankly declaring it a minimum and that installations meeting its requirements would not necessarily be either adequate or convenient for the customer's use.

City Inspector Ray Colby called the industry together to do something about the Fresno ordinance to bring it up to date. He met with cooperative response and meetings were held until the entire group had come to a reasonable agreement. The National Home Builders local chapter, the Fresno Home Builders Assn., who was likewise called in, gave it support.

As Fresno sets a pattern for many of the smaller communities in the valley, while the ordinance covers only the city with its 125,000 population, as other ordinances are brought up to date the basic pattern established by the Fresno ordinance, it is felt, will be followed in these others. Likewise in many counties where no inspection is provided at present, ordinances are contemplated and the Fresno pattern likely will be followed.

A 100-amp minimum service requirement is the major step up in the new ordinance. For single-family dwellings of 900 sq ft or over, the ordinance calls for a raceway not smaller than 1¼ in. in three No. 2 conductors and 100-amp switches or circuit breakers. Provision for a 50-amp and one 30-amp two-pole and eight single-pole branch circuits is to be made. All branch circuits are to be not smaller than No. 12 wire and two 20-amp branch circuits are required for kitchen and breakfast areas. A separate No. 12 wire polarized receptacle outlet is required for automatic clothes washers. Garbage disposers and dishwashers may be installed on the same circuit of No. 12. Other provisions are stepped to the requirements of today's appliances.

"Some people state that we should sell our product and not legislate it," said V. C. Redman, PG and E division commercial manager. "To that we are in agreement. However, we have found from numerous complaints to our utility that the home builder looks to the city electrical inspector and the utility to set the standard as to what he should install. We have had many complaints from people who have purchased speculatively built homes with absolute minimum in wiring. Six months to a year later they have to do a major rewiring job and have complained, 'I purchased a new home, the wiring was inspected by the city. The utility set the meter. Why was it inadequate?' Adequate wiring has to be sold and we are doing a consistent job trying to acquaint the public with it. Incidentally, it has to be sold to various segments of our own industry."

As a method of selling the need for more adequate wiring, exhibits have been made at county fairs and home shows throughout the San Joaquin Division. In these, demonstration boards of three wiring installations have been shown. The picture, "The Magic Link," has likewise been run 72 times to various groups during the past year. Together with newspaper advertising and TV programs, the problem has been presented to the public generally.

It has been found that the public favors the new minimums.

Heaters Kill Germs

Germicidal results in purifying the air in a home or office are greater from a ceramic chimney-type electric heater than from ultraviolet lamps, a paper by Professor Charles E. Clifton of Stanford's department of medical microbiology seems to indicate. His paper is published in *Science,* a professional journal.

Professor Clifton conducted tests in his own bedroom, study and dining room. He likewise made a series of laboratory tests in which the germicidal action was even more pronounced.

During the first hour of heating a room in Clifton's house the air content of bacteria, bacterial spores and bacterial virus dropped 46 to 56%. In the second hour it was reduced another 30 to 80%. Bacterial content of the air in each room varied but repeated samplings in each closely agreed.

In the laboratory tests he used atomized bacterial cultures that passed through the heater's chimney in a fine spray. It killed 80% of the bacteria, 50 to 75% of the bacterial spores and 99% of bacterial virus. Although the type of virus used in his experiments is harmful only to bacteria, he said the effect on viruses that infect humans would be similar.

Reason for the germicidal action is that as air passes through and around the ceramic cylinder, surrounded by the open heating element coil, temperatures inside range from 900 to 1,200 F while the element generates 1,100 to 1,500°. These temperatures are lethal to bacteria and viruses.

Electrical West—Vol. 116, No. 1

"Grounding"— Center of Confusion — III

Tom Hughes
Electrical Engineer
California Division of Industrial Safety

Wanted — Fault Current Return

How resonant voltage step up behaves in a loop

With the use of plastic pipe systems for water mains it means that we are back where we started from 40 years ago, in so far as choosing a suitable grounding electrode but not in accomplishing our real objectives. From the standpoint of controlling the possible entry of lightning or accidental high voltage from the utility company's lines there is still some justification for attempting to achieve a satisfactory connection to the earth (although such hazards are extremely remote in comparison with the circumstances of 40 years ago). However, with high-voltage stray currents, satisfactory protection for the consumer's system can be obtained normally without such a low value of resistance to ground as is required for faults connected with low voltage gradients, if the high voltage line is protected with sensitive relaying normally employed now.

So, reverting to a driven rod as the only choice is not such a tragedy as most people seem to think. Furthermore, buildings of any size are becoming more and more permeated with steel framework, steel reinforcing in the concrete frame and footings, and often steel shell piling driven deep in the ground. Not only does this present a fairly good ground electrode but all metal systems in modern buildings should be thoroughly bonded together to remove any chance of stray currents developing potential differences, regardless of their consideration as ground electrodes. The reasons for this will be covered more fully.

Our real concern, however, is not in grounding but in returning a heavy fault current (which we didn't have 40 years ago) to the fuse center. This can be readily accomplished by proper use of the continuous metal raceway system, which was little known in the average community 40 years ago, or by an additional conductor in a cord or where wires are run open on insulators.

What the electrical profession needs to do is select a fresh terminology that more clearly expresses the objectives we are striving for. That is why the writer suggests dropping the word grounding from the electrical vocabulary to eliminate the differing pictures it engenders in the minds of people in differing pursuits. Instead of the old idea that it has fostered, of trying to herd the current back into the soil, we must sell the concept of the metal raceway system as an additional conductor, used to open the fuse or trip the circuit breaker. *"Fault return network"* is a long and unwieldly phrase but we must get some simple word or perhaps coin one that presents this concept.

Another term or phrase that has contributed to the confusion of ideas is "voltage to ground" (of a circuit). With the increasing use of three-phase, 480-v, wye-connected secondary systems for feeding high-bay industrial lighting fixtures the confusion in interpreting the code is getting out of hand.

The code says that this is permitted where the voltage to ground is not over 300 v. This will actually permit the feeding of 480-v rated fixtures between phase wires, if fed from a wye-connected secondary with the neutral point grounded, or it will permit the feeding of 277-v rated fixtures from a phase wire to neutral, or by carrying the neutral conductor to each fixture.

The variety of interpretations of this permission for higher voltage to ground with industrial lighting and its attendant switching arrangements is often inconceivable and it all revolves around that confusing phrase, voltage to ground. The writer wishes to prove that voltage to ground is a misnomer and point again to the need for new terminology.

Our True Objectives

Instead of the voltage above ground we are concerned with maintaining our electrical distribution system at a set voltage above our *fault-current-return network*. And that, as we stated before, is our raceway system or an additional conductor in the case of open or cord supply.

This is a good place to introduce a subject which should receive more general and realistic discussion among all of us who are concerned with electrical problems in industry. That is the seemingly mysterious exploding switches, motor starters and even occasional switch or circuit breaker panels used on ungrounded systems.

In the light of findings of recent years, laboratory and research men have come to realize that in the atomizing of bus bars and destruction of entire distribution panels, blowing up of starters and motor-rated switches and puncturing of insulation in entire groups of motors we are faced with momentary voltages of several thousand.

For years distributors, electricians, inspectors and insurance men have been scratching their heads over these occasional mysterious blowups and explaining them to the customer as line surges or transients. It is high time we all come to an understanding of the probable cause and its remedy. The whole problem revolves around the proper tying of the electrical distribution system to the metal raceway system and maintaining adequate continuity of electrical path through the raceway system.

Resonant Voltage Step Up

In factories or buildings where three-phase systems are used with no ground on the system, that is, on any of the conductors, or where single-phase systems with grounded neutral are used but sections of the metal raceway system remain isolated from ground by broken continuity, a condenser capacity exists between the conductors and the metal raceway surrounding them. Radio technicians, or engineers who work in a-c circuit problems, call this a capacitive reactance.

Most of us are familiar with the use of industrial-type condensers, capacitors as they are known, for correcting power factor in a-c supply circuits. These capacitors are used across the line or across the leads to a motor or other inductive reactance. If the capacitive reactance of the condenser is made equivalent to the inductive reactance of the motor, at 60 cycles and no load, we will have what is called a state of resonance in this parallel loop.

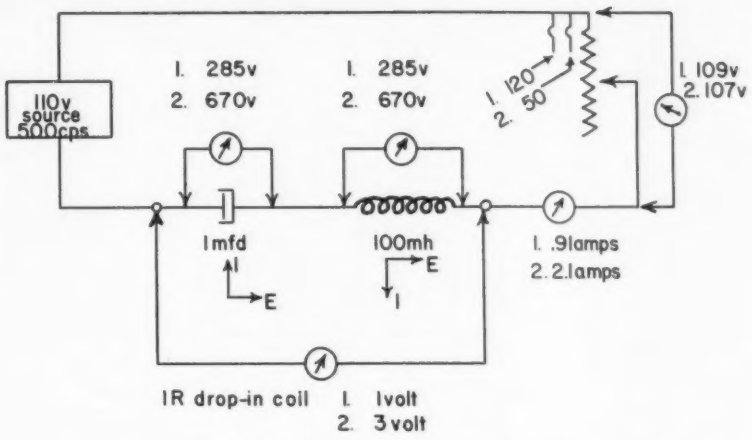


Fig. 1—Schematic of a series resonant circuit

In this state of resonance, the two components pass current back and forth in their closed loop and an enormous step up of circulating current is prevented only by the back electromotive force induced in the motor winding at no load. If, instead of equating the two reactances for resonance (unity power factor) at no load, we were to produce resonance at full load, when the back-emf has dropped to a minimum, we could get a damaging step up in *current* in this loop.

But our problem, in these mysterious blowups, is with *voltage* step up as found in a series resonant circuit. In Fig. 1 we have shown the schematic of a *series* resonant circuit. We have an opposite set of characteristics from those of the *parellel* resonant circuit, with the one exception, the resistance of this circuit is also important in restraining voltage step up just as it was in suppressing current step up in the parallel circuit.

In this illustration we have listed the values for a condenser and coil in a state of resonance at 500 cycles because they are easily measured with normal laboratory equipment. The values numbered 1 are those existing when the variable resistance is set for 120 ohms. Those numbered 2 are the result of the resistance being dropped to 50 ohms. It is seen that the voltage across the reactive components jumps in approximate proportion to the current flow but the increase in IR drop across the coil eliminates the possibility of infinite voltage step up.

If the resistance were left the same but the frequency were changed the voltages would also be affected. Since the circuit would no longer be resonant for the new frequency, the phase relation of the inductive capacitive components would be changed and the voltage drop across each would be up or down in accordance with the reaction of the new frequency.

Our space doesn't permit a comprehensive discussion on the subject of series resonance but the important feature is the enormous step up in voltage that may be produced across either reactive component (as much as 20 to 30 times the line voltage having been estimated at the scene of some burn outs) given the right set of conditions.

If the inductive reactor happens to contain a core or section of core that reaches saturation, under the accidental conditions of the circuit, its reactance may swing, like a pendulum, between saturation at opposite polarities and produce an oscillation in the circuit that develops enormous voltages across one or other component.

An arcing or sputtering fault from conductor or from conductor to raceway, or even a loose connection in a circuit, can cause a transitory oscillation of a frequency which may produce a momentary resonant voltage step up in one of the two reactive components of a series circuit. Complete resonance is not required for voltage step up.

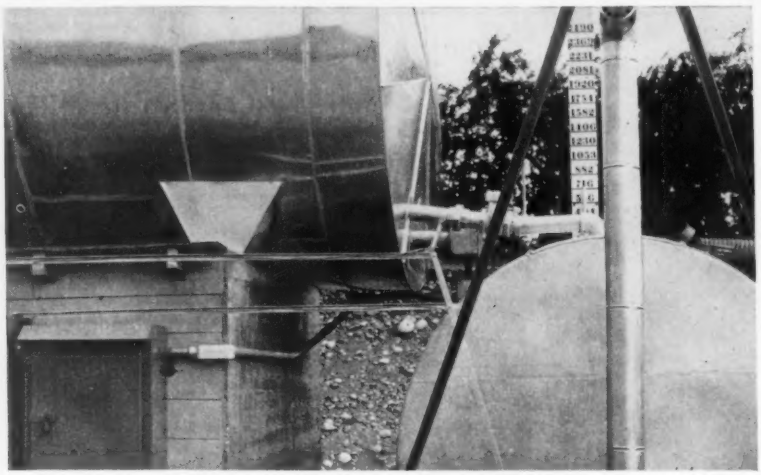
Of course, it is not the momentary voltage peaks that cause the burn outs or explosions in confined spaces. The stepped up voltage causes the initial confined space and makes it conducting, thus turning loose all the current capacity of the source to arc between all phases. Before the ordinary fuse or low-interrupting-capacity circuit breaker can open, the copper within the enclosure may be completely atomized and the door blown open or the cover torn off by the force of the developed pressure.

(In the next article of this series Tom Hughes diagrams what happened in a typical case. In subsequent issues, he will explain why "grounding" is not the answer to these problems.)

Wiring Is Not a Hobby

A warning to the "Do-it-yourself" aspirant is this display board that Larry Carlisle, Eugene, Ore., city electrical inspector (at right), has placed in a prominent place in his office reception area. To emphasize its purpose he has used Graybar's hobbyhorse poster saying, "Electrical Wiring is NOT a hobby. Be safe, be right, consult your electrical contractor," as he shows Howard Colburn, Graybar manager at Eugene (left).

Tubing contains removable heating elements



Shown here are storage tank, left, with the switch panel and the heating tank and stack

Electric Oil Heating

Solves Urban Paving Problem

System Is Adaptable to Paving or Patching

Pat Thomson, Douglas County Engineer, Waterville, Wash.

A permanent heating-storage installation for oil street surfacing material has proved to be the solution for oiling and maintaining a heavy concentration of streets in the Columbia Valley orchard area of Douglas County, Wash.

The usual "hot hauling" of materials used for longer stretches of road was impractical for the shorter, almost urban, streets in the Columbia Valley area. Also, the permanent installation had to be a heating-storage unit capable of meeting top demands of the annual street oiling program as well as the routine maintenance chores through the year.

T. S. Kinney, engineer owner, Petroleum Heating Co., Seattle, designed the unit for the situation after considering viscosity, conductivity, surface filming, flow velocity, cracking and carbonization. Factors considered were:

1. Bitumen type to be stored—A single grade is easier to handle than several mediums ranging from slow to rapid curing. The full range of all asphalts was desired.

2. Supply distance—This determines and affects the delivery temperature at which product is received and the subsequent temperature boosting necessary to meet application rate. This is especially important during the busy season.

3. Withdrawal rate—This in effect determines the number of heating units needed to keep the medium at application temperatures.

4. Application temperature—This may range from 200-340 F, directly influencing the rate at which the bitumen must be heated to meet withdrawal requirements.

Considering these factors, the operation generally demanded a withdrawal of 1,200 gal per half hour at temperatures up to 235 F. Design was based on wattage density, the number of watts dissipated from each square inch of the heater tube when immersed. For asphalt this ranges from 2-5 w per square inch.

Physically the plant consists of a 9,850-gal tank, insulated with 4 in. of fiber glass, covered with a 0.025-in. aluminum sheathing, resting on 8-ft pedestals and draining by gravity flow into a 2,500-gal insulated hot tank. A 3-GRW (rotary gear) Worthington pump with a 3-hp motor delivers 100 gal per minute at 200 F to the distributor.

The large holding tank has three 20-ft heater tubes, rated at 8 kw per tube, operating as a balanced load on the 230 v at three-phase supply, with a rating of 24 kw. The small tank has two banks of 10-ft heater tubes, one four row, one three row, rated 5 kw per tube, operating as a balanced load on the 230-v, three-phase supply. Total rating is 35 kw. Both tanks have separate panels and fused circuits.

The entire unit, complete from tank purchase to delivered hot oil, cost $7,504. It has satisfactorily solved the county's asphalt storage problem. Electrical heating has eliminated the inconveniences and uncertainties of prior steam heating. Drawoff of 850 gal every 20 minutes at 225 F for a week straight has been practiced without any trouble. One setting of the thermostats provides hot oil for fast crew operation.

ELECTRICAL WEST SALES GUIDE © JANUARY 1956

News Letter

FOR THE ELECTRICAL MERCHANT OF THE WEST

Live better

Taking part in the national Live Better . . . Electrically program utilities throughout the West will be host to the industry at Feb. 8 kickoff meetings. Highlight will be a closed-circuit telecast with TV personality John Daly as master of ceremonies and a list of speakers representing the industry and its allies in this program—architects, builders, editors, lending agencies and others. Kinescopes will be run off at later programs. Utilities that have announced they will sponsor the Feb. 8 telecast are: PG and E at San Francisco and Fresno; San Diego G&E at San Diego; Arizona PS and Salt River Power District at Phoenix; Tucson GEL&P at Tucson; Department of Water & Power at Los Angeles; PP&L and PGE at Portland; joint sponsorship by local utilities at Seattle; WWP at Spokane; Utah P&L at Salt Lake City; joint sponsorship at Tacoma; Southern Nevada Power at Las Vegas.

All out on AW

A national consumer publicity program on wiring to begin in the spring of 1956 has been approved by the Edison Electric Institute board of directors, according to O. R. Doerr, PG and E vice-president and chairman of EEI's commercial division executive committee. Promotion will be centered around the term, Housepower. The program was designed to complement existing wiring programs and to provide a rallying point for the industry to attack the wiring bottleneck.

Electric week

National Electric Week will be celebrated during the second week of February, coinciding with Edison's birthday. The seven industry groups that worked out the plans: ACRI, EEI, IAEI, IAEL, NARDA, NAED, NECA.

Winter market

San Francisco's Winter Market will be held Feb. 6-10, with the traditional Radio-TV-Appliance dinner on Feb. 8. Speaker from the electrical industry will be Edwin Vennard of Chicago, president of Middle West Service Co., who in June becomes vice-president and managing director of EEI. His topic will be "Keying Your Success to Electrical Progress." The happy choice of date makes this talk also the kick off for local celebration of National Electric Week.

Sales rally

San Francisco Sales Executives' Assn. will hold its third annual sales rally at the Civic Auditorium on Jan. 26. Speakers will be Don G. Mitchell, chairman of the board and president of Sylvania, and Dr. Charles L. Lapp, author and professor of marketing at Washington University, St. Louis, Mo. The group had 7,000 at last year's rally; expects more than 8,000 this year.

Northern California Electrical Bureau will sponsor a series of four night sales clinics to be presented by Dr. Benjamin Franklin Bills of Chicago, noted teacher of salesmanship. Emphasis will be on competitive selling. Meetings will be held during the period March 12-April 23 in San Francisco, Oakland, Fresno, Stockton, Sacramento and Sonoma. — Sales clinics

San Diego Bureau of Home Appliances will hold its Winter Conference on Feb. 29, a date possible only in Leap Year. E. W. Meise, San Diego G&E, is program chairman. — Winter meeting

NEMA's Electric Fan Section has put out a revised edition of Standards for Electric Fans, covering recommended ways of testing and rating different types. This new manual, FM1-1955, is designed to help measure and distinguish between the performance of fans for general use and for ventilation only; is expected to eliminate much of the confusion now existing. It is available at $3 a copy from the Electric Fan Section, National Electrical Manufacturers Assn., 155 E. 44th St., New York 17. — Revised

Keith Kirstein of Radio-TV Service Co., Sacramento, was elected president of the recently formed California State Electronics Assn., organization of TV dealers and servicemen . . . New president of the Tucson Appliance Merchandisers Assn. is Hector Larriva, Arizona Appliance Mart. — Elected

Four Westerners were among about 50 electrical distributor executives scheduled to take the NAED training course at Harvard Graduate School of Business Administration in January. The last such course was held in June 1954. Those from the West are: Frank E. Johns Jr., Empire Supply, Visalia, Calif.; Richard W. Power, Von Hamm-Young, Honolulu; E. D. Guilbert, Service Electric Supply, San Jose; J. C. Peace, Coast Electric, San Diego. — Take training

Honolulu Electrical Products Co., a $3,000,000 company, has been set up as a wholly owned subsidiary of Hawaiian Electric Co. It takes the place of Hawaiian Electric Supply, which has handled HECO's merchandising program since 1952. A separate corporation set-up was decided upon to overcome objections of local dealers to similarity in name of utility and merchandising department. Offices of Honolulu Electrical Products will be at 930 Clayton St., headquarters of Hawaiian Electric Supply. HEP will be Hawaii representative of Westinghouse and territorial representative for other mainland manufacturers and distributors. Officers are Leslie A. Hicks, chairman of the board; Paul H. Anderson, president; George Hogg, treasurer; Ralph B. Johnson, secretary. — New set-up

Idaho Power Co. is holding a series of area meetings in January for dealers, contractors, service shop operators and distributors to tell plans of its sales program, "Strike It Rich in '56." — On the road

Kaemper & Barrett recently was appointed northern California distributor for Du Mont TV, radio and hi-fi. Headed by W. H. Kaemper, the San Francisco firm is celebrating its 25th anniversary. Cal Smoot, vice-president, will handle the Du Mont line. — New line

Aid to flood victims

Although damage to major appliances in the northern California and southern Oregon flood areas could not be estimated in the early days following the disaster, manufacturers were quick to offer aid in reconditioning and replacing units. Most of the factory plans offered free parts and, where appliances were beyond repair, low replacement prices through authorized dealers. Except in special hardship cases, allowances on service charges, if made, were up to the dealers and it was reported that individual stores were assuming from 50 to 100% of such costs in some localities. Ads and news releases urged that water-soaked appliances be checked as a precaution against electrical shock, contamination or further damage. One manufacturer made special provisions for replacing dealer stocks damaged by the floods and another sent dealers in flooded areas a special fund earmarked for local advertising advising customers where to go for appliance reoperation service.

Geigers and dollars

Hotpoint introduced its 1956 line to dealers in the 11 Western states with a musical comedy type show at the Fairmont Hotel in San Francisco. About 350 distributors, dealers and utility people attended this showing, which is expected to be an annual event. In most areas distributors put on contests, sent winning dealers to San Francisco. Los Angeles had its own showing but was represented also at San Francisco. An all-day meeting included the show, put on with professional talent by MCA, and presentations by department managers from Hotpoint's Chicago headquarters. Group meetings held the following day included a San Francisco holiday tour staged for some 60 people from the Seattle division. The stage show, Geigers and Dollars, cleverly pointed the moral that more money can be made by sticking to one's own product than by trying to get rich quick in a new field.

Drops TV

Frank Edwards Co. last month announced that it was retiring from the TV field and expanding its white goods lines. Just previously it had taken on the CBS-Columbia line and no announcement has been made as to where this distributorship goes. Commenting on the TV business, President Frank Edwards said there was a definite squeeze on distributors and dealers which might bring many changes.

Will fold

Deepfreeze Appliance Division, Motor Products Corp., reportedly will discontinue operations sometime this spring. It is expected, however, that the 17-year-old name will be bought by some other manufacturer.

Nets sales

Southern California housewives were shown how to wash synthetics with automatic laundry equipment in a series of Launderamas sponsored by Sues, Young & Brown and local Norge dealers. Conducted by Dorothy S. Huse, SYB home service director, the shows included free gifts, prizes and refreshments...Reporting on this activity nationally, Norge Vice-president R. C. Connell said that on-the-spot sales were made to four out of 25 attending in-the-store demonstrations; cited as examples two Western shows: Kops Piano House, Great Falls, Mont., where 14 appliances were sold to 34 women attending; Oregon Valley Service, Albany, where eight of the 24 attending bought washers or dryers.

California's Supreme Court upheld Fair Trade laws in three opinions handed down last month. An order for inspection of G-E's cost accounting records secured by Affiliated Government Employees Distributing Co. in Alameda County Superior Court was reversed by the high court, which observed that the legislature has not limited the price a producer under the act may demand for his product so long as there is fair competition. In another case—this one involving G-E and the Federal Employees Distributing Co.—a judgment against the manufacturer was reversed. The court said that exceptions allowed to certain classes of buyers did not invalidate fair trade contracts. The third case involved a drug firm, a nonsigner. A lower court decision for the manufacturer was upheld by the high court.

High court on Fair Trade

A Los Angeles supermarket chain, Thriftimart, is selling major appliances on a test basis at one of its markets near Lakewood. If sales are good the grocery chain expects to place electric and gas appliances in all new markets. According to Sales Manager Robert Laverty, sales have been fairly satisfactory so far, with appliances at least paying their own way but no decision on expansion is expected for another six months. The appliances carried include ranges, freezers, garbage disposals, dishwashers and color TV sets.

Chain puts in appliances

Norris-Thermador has moved its product research and development activities into a $125,000 building at 2017 Camfield Ave. in east Los Angeles. Under supervision of F. M. Pence, vice-president, Thermador Division, the new laboratory has 17,000 sq ft of space; sheet metal working and machine shops; facilities for model making, design and drafting, product testing and simulation of all conditions of temperature and humidity.

Research lab

Bruce Wilson, former major appliance manager for Thomson-Diggs in San Francisco, has taken Space 496 in the Merchandise Mart and is setting up his own business under the name Duplex Corp. Lines to be handled will be announced later. Thomson-Diggs recently closed its San Francisco office; consolidated its appliance division into its old-line hardware division with headquarters in Sacramento.

Starts business

Admiral Distributors has moved its Fresno branch from temporary warehouse quarters to 260 Fulton St. Darrel R. Peron has been transferred from Los Angeles as local manager for the branch, which covers central California counties.

Moved

Easy personnel and distributors in the West heard details of its acquisition by Murray Corp. and plans for a January product showing in Chicago over a direct telephone hook-up from Syracuse on Dec. 3. The 53-city telephone conference, believed to be the largest hook-up ever to go through the New York exchange, included the San Francisco division office, Salt Lake City, Phoenix, Reno, Spokane and Billings district branches. Seattle, Portland and Los Angeles personnel were in San Francisco for the hook-up. Speakers included Murray President B. C. Gould and W. Homer Reeves, Easy division manager. Heading up Easy on the coast are J. C. West, California division manager, and D. B. Wallrich, Pacific Northwest manager.

Hook-up

All previous attendance records were broken at San Diego's 18th Annual Electrical & Home Appliance Show, which proved another . . .

Spectators were interested in appliance displays, particularly color and built-ins

TV and electronic booths also attracted good crowds, who came to buy, not just to shop

Selling Show

An all-time attendance record was established for San Diego's Electrical and Home Appliance Show, when 185,000 persons attended during the six-day run, Nov. 25-30. Sponsored by the Bureau of Home Appliances, the theme was "Preview of Tomorrow's Living."

More than 75 exhibitors participated. Several manufacturers flew entire 1956 lines to the show, which served as the first public showing for a number of products. "Dealer on Duty" signs reminded spectators that they could shop in the booths.

The event proved a tremendous boost to appliance sales, according to Clark Chamberlain, bureau secretary-manager, who reports that its stimulating effect on business was evident during the show and in the days immediately after the closing.

Unusual interest was exhibited in new trends in appliances—color, built-ins and automatic features. An innovation this year was the combined exhibit of electronics manufacturers in the county with the San Diego Naval Electronics Laboratory display.

The 1955 show was the 18th annual sponsored by the bureau. It opened traditionally the evening after Thanksgiving, just as the colorful Christmas Tree Lane opening ceremonies were held on the steps of the Natural History Museum, across the street.

At their first annual conference members of the Snake River Valley Electrical Assn. heard industry speakers point out need to . . .

Cooperate in Building Business

Young Koch Toedtemeier Falkner Bruce

Falge Gilbert Falkner Kimball Wright

Stressing the importance of intra-industry cooperation in building of individual businesses, the Snake River Valley Electrical Assn. held its first annual electrical conference in Boise, Idaho, Dec. 3.

The day-long session, which featured industry segment seminars on electronics, retailing and contracting as well as general sessions, was attended by more than 200 area businessmen.

Emphasizing the potential future development of the Snake River Valley area, John T. Kimball, vice-president and general manager of the Idaho Power Co., told the group: "Power consumption has doubled and redoubled in the past 10 years, with no indication of letup. We are on the threshold of the brightest future the industry has ever known," he said, "and the man who is ready for opportunity will realize ambitions undreamed of today."

F. M. Falge, Oakland, Pacific sales division, General Electric Co., and new regional supervisor of the "Live Better Electrically" program, keynoted the morning session with a complete outline of the all-industry sales promotion drive. "The entire industry will concentrate on an all-out promotion to further expand the American standard of living by increased use of the new products and services of the industry," he pointed out. "We are going to spearhead a powerful promotion that will

win for the industry a larger share of the consumer dollar and every person will benefit by living better, the Electric Way."

Activities Told

Henry H. Falkner, Westinghouse Electric Supply Co., president of SRVEA, outlined the year's activities of the association. These included sponsoring the Home Show, various legislative functions, sales promotion programs, institution of a group-insurance program, industry public relations and industry fraternal activities, he said.

A. S. Gilbert, Idaho Power Co., served as general chairman of the event, assisted by Falkner and Lysle Keith, Enterprise Electric Co., as coordinators. Other committee members were Morris Saville, G-E Supply, arrangements; Joe I. Wright, Afton-Lemp Electric Co., program; W. R. Reed, I. P. Co., attendance; R. C. Young, Young Electric, registration; J. O. Malvin, manufacturer's representative, hospitality; Maynard Smith, Graybar Electric, displays; and Lysle Keith, banquet.

Women's activities, including a luncheon and style show, were carried out by the "Livewires," an area group of wives of electrical businessmen. More than 50 wives attended.

Business Meeting

At a short business session following the seminars, the new directors of SRVEA were announced.

Retailers—Leslie Scott, Scotts Locker and Appliance, Emmett, Idaho; Ernest Fisher, Terry Appliance, Boise.

Contractors—Maurice Cook, Cook Electric, Nampa; I. Lysle Keith, Enterprise Electric, Boise.

Electronics—Rod Frost, Boise TV-Radio; Dick Egelstron, Egelstron Radio-TV, Boise.

Distributors—Joe Wright, Afton-Lemp, Boise; William Dyett, Salt Lake Hardware, Boise.

Manufacturers — Paul Worthen, G-E, Boise; Joe Devine, Westinghouse, Boise.

Utility—A. S. Gilbert and J. F. Emery of Idaho Power Co., Boise.

Named as new officers of the board of directors were: Henry F. Koch, Electric Service Co., Boise, president; Harold Toedtemeier, KIDO-TV, Boise, vice-president; James Bruce, Idaho Power Co., Boise, secretary; R. C. Young, Young Electric, Boise, treasurer; Henry H. Falkner, Westinghouse Electric Supply, Boise, immediate past president; and Vic Goertzen as secretary-manager.

Marguerite Fenner, Pacific Gas and Electric Co. home economics director, looks at kitchen center with R. A. McWhinney, G-E Supply, and Gordon Smith, major appliance division

Mrs. Fenner and Richard LaPado point out paint and linoleum samples in the Do-It-Yourself display. Refrigerator was painted in shop but with home workship equipment

Mix-or-Match is G-E Theme

"Mix-or-Match" will be stressed in promoting the General Electric 1956 appliance line, which was shown to dealers throughout the West last month. Introduced last year, the mix-or-match colors—canary yellow, turquoise green, petal pink, cadet blue and woodtone brown—are now available in paints and in tiles and linoleum. Probably to come are curtain materials and other related products in the five basic colors.

Typical of the showings was the one at Oakland, where R. A. McWhinney, major appliance sales manager for G-E Supply, was host to northern California dealers at the Leamington Hotel. Assisting McWhinney were Frank Jordan, builder division sales manager, and Richard LaPado, sales promotion and advertising manager.

More than 50% of the women interviewed by G-E want color in major appliances, McWhinney said. In a few years color preference has gone from less than 5% to more than half the market, he stated.

Attention-getters were the wall refrigerator-freezer with the new magnetic lock that is "child safe," and the kitchen center. Little or no remodeling is needed to hang the refrigerator-freezer, it was pointed out. The cabinet is mounted on a 5-ft "picture hook" bracket which is screwed to the wall and can be removed if desired. The kitchen center puts all other major appliances for kitchen and laundry into one unit under a stainless steel counter 9½ ft long. Included are a combination washer-dryer, dishwasher, garbage disposal unit, counter-flush range and oven plus a built-in sink. A storage top, sold as an accessory, includes a specially designed radio. The display included an additional oven.

ELECTRICAL WEST

Hail and Farewell "Kelly"

KELLY Courtright is gone. That thought to the electrical industry that knew him so well leaves a void never to be filled by any but "Kelly" himself.

Few men encompass the full range of an industry as H. H. Courtright did. As a youngster he sold lighting fixtures and the wiring of houses as a door-to-door salesman in San Jose. Later he was a contractor, and a dealer, then a distributor, and finally invaluable aide as a utility executive. Thus he had experience in each field. But what is more rare, he had understanding. Not only did he know the technical, but more importantly, the human aspects of each. With such understanding he was the correlator, the missionary of cooperation.

Always selling, in its finest sense, always enthusiastic, always shining with a vision of bettering—bettering people, bettering their methods, bettering public relations, bettering the industry, bettering living for all its customers. There aren't many such men walk the earth.

Perhaps the last of the old San Joaquin Light & Power team—the Wishons, L. J. Moore, Al Joy, Fresno Jack Frost—went with "Kelly" into history. During an era of strong utility merchandising, "Kelly" Courtright initiated the Through-the-Dealer Plan—first of its kind in the Nation. This won for him the James H. McGraw Award for Cooperation at the behest of a grateful industry. His service to the industry through its associations and programs was a record of complete devotion and inspiration.

Often tempted by offers of bigger industry positions, some of the most important in the country, he had the sense of proportion, rare in anyone, to measure his capacity to do his most effective job and limit himself to his beloved San Joaquin Valley. His personality and friendship carried the people with him through hostile elections and agricultural hard times. His final task was to father through to start of construction the Kings River hydroelectric project. Appropriately Helms Creek Dam and reservoir, highest, thus nearest Heaven, of the units in the Kings River system, will bear his name as a monument to his memory.

"Kelly" was private initiative at its best. He was a leader always a step ahead of the times. Long live his memory and his unselfish example of kindness and friendship.

Do Commissions Retard Progress?

MANY distribution engineers seem to fear that state regulatory bodies might frown on new ideas in overhead construction that deviate from present-day commission rules or long-established practice. We do not speak for regulatory bodies of Western states but we doubt very seriously that utility men are justified in their apprehension.

Our view, quite on the contrary, is that commissions are progressively minded and would welcome trial installations that are safe, look better and cost less.

Public service commissioners and their engineers are fully aware of the problems of higher labor and material costs that face utilities and of changed public sentiment that call for a more streamlined type of construction. We venture to say that if utility engineers would go to commissions with their problems they would find a receptive and cooperative mood.

Are They Swallowing a Camel?

ALL of the floundering around over smog control in the Los Angeles area makes one wonder if the Air Pollution Commission is not "straining at a gnat and swallowing a camel."

Under restrictive legislation industry has spent millions and millions to help abate the smog problem. Burning in back-yard incinerators has been placed under regulation as to hours. An attempt is made to restrict the use of automobiles during bad smog conditions.

So far as we can see, all these remedial measures have been of little avail. Smog conditions are as bad or worse than they have

EDITORIAL VIEWS

ever been. All of this makes one wonder if most all the experts on smog aren't off entirely on the wrong foot.

Until more is known about what causes smog it seems unjustifiable for those armed with legal authority to belabor industry, by slapping fines on the electric utility for the blue haze from its steam-plant smokestacks.

Crow Is Mighty Poor Eating

WITHOUT getting into a discussion on the dietary habits of a few REA cooperative leaders in Colorado, it seems timely to comment on their apparent affinity for eating crow.

Speaking before a House subcommittee, T. G. Bonar, president of Union Rural Electric Assn. Inc., labeled private utility national advertising "communistic tactics."

He then suffered the double embarrassment of a retraction and of hearing a rebuke from Rep. Glen Lipscomb (Calif.).

Frank Meaker, head of the four-member Colorado-Ute Electric Assn., is still paying for his unfortunate statement that Colorado-Ute was forced into a "shotgun wedding" with Western Colorado Power Co.

Two member cooperatives of Colorado-Ute recently asked him to resign his position "for his shotgun wedding charge, which we believe is entirely unfounded."

A sign frequently seen in editorial offices might be useful to those who are inclined to make derogatory remarks about someone or something. The sign says:

"Before you louse it up . . . THIMK."

THOSE favoring big government, paternalism, government ownership, socialism—call it what you will—give control of electric energy by government high priority. Such control can be obtained only if the movement has popular support — or lacks popular opposition. This means there must be a strong appeal if government ownership is to be sold to the people. The most obvious appeal is price. Actually, in a country of such technological competence as ours, cost differences in power production, as between public and private development, in a given area, will be slight provided all costs are included by each. Since the primary objective of public power is political, it must be made to appear cheaper than investor-financed power. With true costs the same, the only way an advantage can be shown for public power is by subsidizing it. Subsidy is, therefore, a political necessity; and our studies show that all federal power is subsidized. The subsidy takes one or more of the following forms which are evidenced in lower power rates: (a) Use of interest rates which are lower than the actual costs of long-term money; (b) omission of interest during construction; (c) omission of federal income taxes or comparable contribution to the cost of the federal government; (d) with two exceptions (Hoover Dam and TVA) omission of state or local taxes; (e) charging large parts of the initial capital costs to wholly subsidized federal activities such as flood control, navigation, fish and wild life, etc.; (f) charging administrative costs, insurance and pensions to other government accounts . . . Any one of these examples should show why no private business can compete with a government business. A private entrepreneur must meet all costs. The government can always shift some costs to the general taxpayer. Under such conditions, fair competition is impossible.—Admiral Ben Moreell, chairman of the Second Hoover Commission's Task Force on Water Resources and Power.

Electrical West—Vol. 116, No. 1

A MESSAGE TO AMERICAN INDUSTRY • ONE OF A SERIES

Business Investment Holds Key To Both Growth and Stability

What federal tax policy will best promote both growth and stability in the American economy? The Joint Economic Committee of Congress has been asking this crucially important question in public hearings. This editorial suggests one vital part of the answer.

The proposition advanced here is that—

> Tax policy must encourage a continuing high level of business investment in new plant and equipment, because such investment makes a special contribution to *both* economic growth and economic stability.

Growth Needed for Security

We must have both growth and stability.

A vigorous economic growth is essential to our national security. As Congressman Wilbur D. Mills said in launching the Joint Committee's hearings, "The present complexion of world affairs places a premium upon strength and growth in our national economy." Growth is likewise a major ingredient of a healthy domestic economy. Growing enterprises and growing communities offer far more opportunities for satisfying careers than those which are not growing.

A reasonably stable economy, without violent ups and downs, is also essential to our national welfare. Extravagant booms and their more or less inevitable result, severe depressions, waste labor and resources and cause great human misery. Both major political parties have accepted the obligation imposed by the Employment Act of 1946, that the federal government work to maintain high and stable employment.

There is general agreement that **the key to economic growth is investment in new plant and equipment.** Growth depends decisively on new facilities to increase production, and also to produce new and better products in new and better ways. At the same time, new plant investment provides employment for the important, and well-paid, one-fourth of our industrial workers who manufacture and build new production facilities. So if the process of business investment is kept on an even keel, the result is not only growth but also stability in a substantial sector of our economy.

But authorities disagree on the possibility of maintaining a high level of business investment for any great length of time. Some fear that it will lead to an excess of producing capacity and the glutting of markets, with recession or depression not far behind.

The history of our country offers some basis for the fear that it is dangerous to maintain a very high level of business investment. There have been times when the economy has suffered under the weight of excess producing capacity. **This fear, however, has been made obsolete by the recent course of our economic history which, in its earlier phases, nourished the fear.**

The World Has Changed

Here are some of the major considerations, cited at the Joint Committee hearings, which support the conclusion that we not only *can have* a high level of business investment and economic stability but that we actually *need* a high level of such investment to assure stability.

(1) Over the next 20 years our population is expected to increase by about one-third. But most of the population increase will come in age groups younger or older than normal working ages, and people will probably work fewer hours per week. Thus hours worked are not expected to increase more than 15%. Consequently, we must have a relatively large increase in the amount of production equipment per worker if our standard of living is not to suffer. This means a high level of new investment.

(2) About half of our present business investment goes to replace worn-out equipment, rather than to expand capacity as was true during the early stages of our industrial development.

(3) Thanks largely to the impact of organized research—for which we as a nation now spend about $4 billion a year—a large share of capital investment now goes to provide new products and new processes, rather than to expand existing capacity.

These developments make it unlikely that we shall develop the burden of excess capacity that plagued the economy in earlier periods. **Moreover, most capital investment plans are now made on a long-range basis. Companies are building facilities to anticipate their needs for several years ahead.** This increase in long-range planning has reduced the disturbing effects of temporary shortages and excesses in producing capacity.

The record of recent years speaks for itself. Business spending for new plant and equipment in 1955 was over $29 billion. This continued the high level of investment that has been maintained for the past ten years—a decade remarkable for both impressive growth and gratifying stability. A McGraw-Hill survey of preliminary plans for 1956 indicates another year of increasing investment, and expanding business activity.

Tax policy, to be successful, must consider this impressive contribution of business investment to both growth and stability.

Of course, the level of investment depends on many factors other than federal tax policy. The degree of business confidence is important. So is the strength of consumer markets. So is the attitude of organized labor toward the use of more efficient machinery. But tax policy is a crucially important factor. And it is becoming more so with new developments in our changing economy. These developments indicate that tax policy **must be geared to foster a high level of business investment, if the dual objectives of economic growth and economic stability are surely to be attained.**

This message is one of a series prepared by the McGraw-Hill Department of Economics to help increase public knowledge and understanding of important nationwide developments that are of particular concern to the business and professional community served by our industrial and technical publications.

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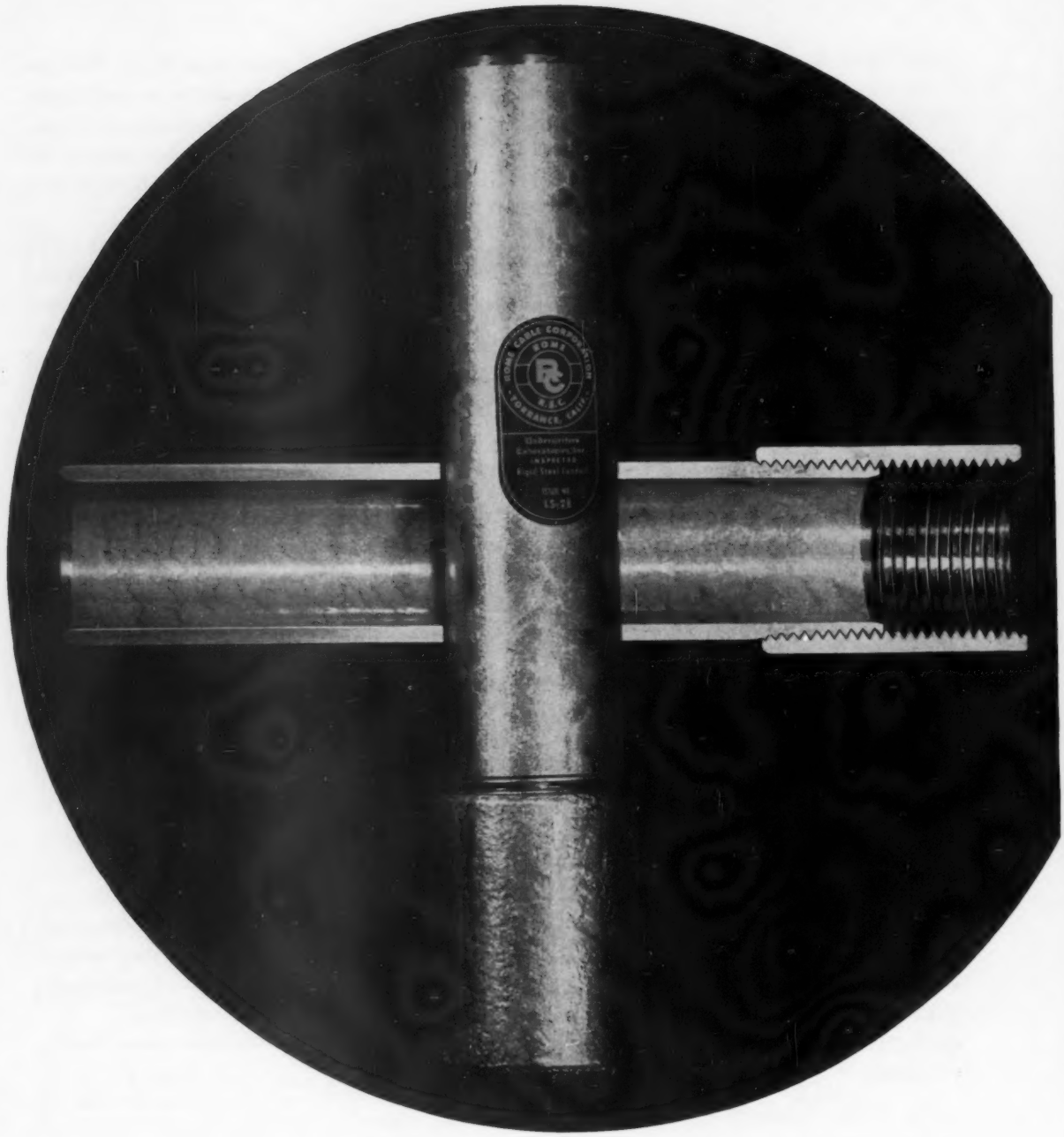
Donald C. McGraw

PRESIDENT

McGRAW-HILL PUBLISHING COMPANY, INC.



Cutaway section of Rome • Rigid. Rome • Rigid is threaded to give you fast, easy coupling connections in assembly.

You get corrosion-free protection from Rome • Rigid's hot-dip galvanized coating. It takes bending and rebending without flaking.

Rome • Rigid is stocked at Torrance, California, for immediate shipment in sizes ½" to 6".

INSIDE AND OUT

the finish of Rome • Rigid means lower installation costs

Because that's where your cable goes, it's important that the inside of your conduit be smooth. There should be no burrs, no flash, no rust, no finish that flakes—just a smooth surface.

That's what it's like inside Rome • Rigid. As a matter of fact, it's like that on the *outside*, too. And it stays that way.

There are a number of reasons why Rome • Rigid is so smooth. First, it's made from hot-rolled sheet steel, shot blasted on both sides to remove all dirt, rust and roughness.

Then, it's cold formed, thereby maintaining uniformity of wall thickness and strength and electric resistance welded into a strong pipe of uniform diameter and surface quality. A scarfing tool removes any weld flash, inside and out.

The exclusive Sendzimir hot-dip galvanizing process, which follows, gives Rome • Rigid a bright annealed oxide-free surface. First, a flame preheater, with carefully controlled atmosphere, burns off dirt, oil or scale. Next a reducing furnace completely anneals the pipe, making it soft and ductile; and the blue oxide surface left by the flame preheater is reduced to a mirror-smooth, clean finish, free of stains.

From the reducing atmosphere of the furnace, the conduit goes directly into the zinc bath without temperature variation or chance of oxidation. A steam wipe removes excess zinc.

Bending without flaking • This results in conduit zinc so bonded that it will take an unbelievably high degree of distortion and bending with complete absence of flaking.

A smooth, easy-to-fish inside finish • You get conduit with a slick, low-friction inside finish that's easy to fish, easy on your cable.

Production is quality controlled at every step, giving you a rigid conduit that's easy to work with when you buy Rome • Rigid. Smooth inside for trouble-free pulling. An outside finish that can take bending and rebending without flaking. Find out for yourself why Rome • Rigid is the favorite heavy-wall steel conduit in the West.

It Costs Less to Buy the Best

ROME CABLE Corporation
ROME • NEW YORK
and
TORRANCE • CALIFORNIA

THINWALL CONDUIT

Rome • EMT is a superior electrical metallic tubing, electrically welded for extra strength. It *is easier to fish than any other EMT on the market today* because of its sparkling new inside finish. The exterior finish is new also: a Rome process which not only combats corrosion but looks smooth and clean as well. Mirror-smooth inside—clean, smooth and neat appearing outside—Rome • EMT is an outstanding value. Compare it for yourself against *any* other EMT on the market.

Rome • EMT is immediately available in sizes ½" through 2" from the following Stock Distribution Centers.

Atlanta, Ga.
Chicago, Ill.
Dallas, Texas
Denver, Colo.
Houston, Texas
Kansas City, Mo.
Los Angeles, Calif.
Rome, N. Y.
Salt Lake City, Utah
San Francisco, Calif.
Seattle, Wash.
St. Paul, Minn.
Torrance, Calif.

Northwest Association Faces Active Year

Members of the Northwest Electric Light & Power Assn., meeting in Spokane in November, planned the section conferences to be held in the coming spring. Following is a report of their plans.

Accounting

J. R. Cawlfield, Chairman
Pacific Power & Light

The accountants are to meet in Portland at the Multnomah Hotel June 20-22. As usual the program will divide along general accounting and customer accounting lines and some of the sessions will be general while others will be parallel with the two groups meeting separately.

Electronic accounting will occupy a prominent spot on the program. Other subjects to be covered either by individual or panel presentation are:

Study of work order practices, on-the-job training for accountants, minor material accounting, budget control, internal audit procedures, credits and collections, customer accounting (miscellaneous topics), transportation costs determined by pay roll loading.

Business Development

Jack Kimball, Chairman
Washington Water Power

Special emphassis will be placed on the competitive aspects of natural gas in the conference of the Business Development Section, to be held in the Benjamin Franklin Hotel, Seattle, May 21-23.

Other subjects that will receive special attention at the conference will be area development and electric space heating.

As before, a portion of the conference will be general sessions and a portion devoted to parallel bureau sessions with Frank Tool, Washington Water Power Co., heading Electric Home Bureau, and Wayne L. Shaw, Utah Power & Light Co., heading Commercial and Industrial.

This year, the Personnel & Safety Section will meet with the Business Development group in Seattle and will present part of the general session programs.

Other committees meeting with the Business Development Section are: advertising & publicity, Fred Kempe, Portland General Electric Co., chairman; and the rate research committee, headed by Fred Groch of the same company. Clarence Scheyer, Puget Sound Power & Light Co., is general chairman of arrangements for the meeting.

Personnel & Safety

Russell James, Chairman
Portland GE

Part of the program of the Personnel Section will be devoted to safety subjects under the chairmanship of Claude Haggard, California-Oregon Power Co. The safety committee will hold its own group meeting during a part of the session.

Some of the subjects to be considered by this section are: training supervisors in uniform union contract interpretations, human relations, increasing the effectiveness of labor, aptitude minimums for apprentice linemen, the science of management, third party accidents, electric shock treatment, utility organization and communications.

Engineering & Operation

Maurice Hatch, Chairman
Washington Water Power

The Engineering & Operation Section is to meet in the Hotel Vancouver, Vancouver, B.C., April 11-13. J. H. Steede, B.C. Electric Co., vice-chairman, is in charge of the program. The purchasing committee, an independent committee under Nathan L. Scott, Idaho Power Co., will meet with the section.

B. C. Electric Co. offers many opportunities for inspection of new and interesting construction, notably the 345-kv transmission line and substation. This and other works may be visited on Saturday, April 14. Exhibits of new equipment by manufacturers may be provided for this year as an innovation.

The conference will follow last year's plan of breaking its several committee sessions into two sessions; one in which the subjects of more general interest will be covered and one in which more detailed discussions will be provided for. These latter committee sessions will run concurrently to offer more time for more subjects.

Committee chairmen who will conduct programs are: utilization, J. R. Downing; electronics, H. M. Lewis; meters, codes & services, Roy Crosby; power production, Elmer Bayles; transmission & distribution, L. G. Brewer; house heating research, Cliff McAdams; and electrical equipment, D. R. Russell.

A few of the subjects to be taken up in the committee sessions are:

Operational problems and experience with microwave and supervisory control systems; the nature of the hydro vs fish problem with someone speaking on this from the commercial and sport fishing standpoint; latest developments in atomic power; the future of steam plant development with the fuels that are available; gas turbine developments for large capacity; bundled conductors vs single conductors in high-voltage transmission; heat pump progress for domestic and commercial applications; progress in vacuum tube-type breakers; and operating experience with high-speed transmission relays.

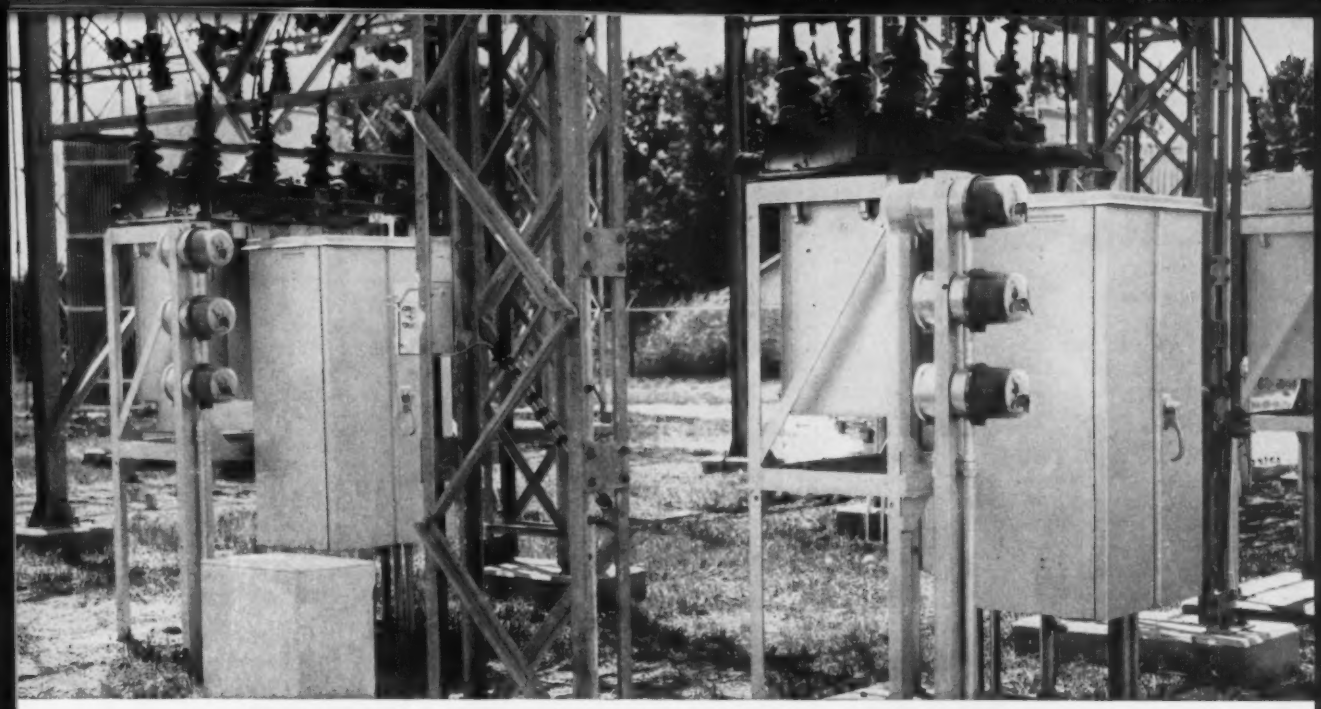
PCEA Directors Plan Convention

At a recent meeting of the board of directors of the PCEA, plans for the forthcoming convention were formulated and appointments made. The convention will be held in Las Vegas from May 14 to 16. J. H. Pengilly was named general convention chairman and D. D. Smalley and L. M. Guibara were both named assistant chairmen. J. M. Tuttle was appointed program chairman. Other convention appointments will be announced soon.

Section Programs

Engineering & Operating Section of the PCEA is developing a program for the conference to be held March 22-23 at the Sheraton-Palace Hotel in San Francisco. Announcement of the completed program will be made public shortly.

Residential adequate wiring committee of the PCEA, which supervises certification of adequately wired homes in the territory served by Southern California Edison Co. and California Electric Power Co., has adopted a new set of certification standards effective Jan. 1, 1956. New standards require that the main service be of 100 amp capacity. This change conforms with the program sponsored by the National Home Builders Assn.



Overall view of substation showing socket-installed Lincoln ammeters and voltmeters on two circuits.

LICK LOADING PROBLEMS WITH LINCOLN METERS

flexible, fool-proof, low cost method gives complete substation measurement

Now, you can get simplified measurement for system operation — at your substations —by means of a permanent installation of meter sockets and the use of various types of Lincoln "Indicating Meters with a Memory." You can secure detailed knowledge of circuit operation by "plugging in" Lincoln Graphics to obtain time of occurrence and duration of system conditions.

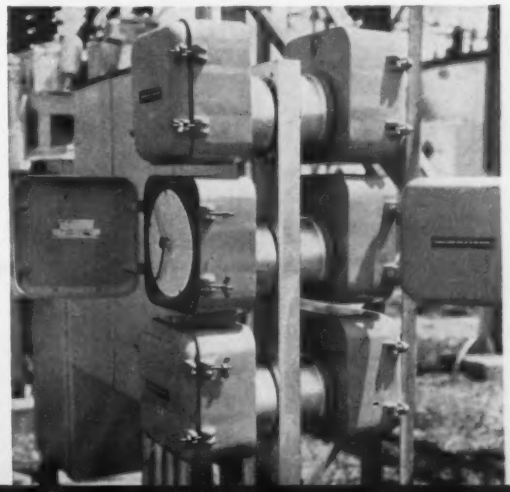
Socket type meters to measure amperes, volts, vars, or kw can be installed in any of the sockets. Any lineman can make the installation, since no wiring changes are necessary. The socket makes the correct connection for the meter "plugged in."

Write today for full information on Lincoln Meters and Simplified Measurement for System Operation.

SANGAMO ELECTRIC COMPANY
SPRINGFIELD, ILLINOIS

This permanent installation of ammeters shows loading and balance on phases.

Reactive and Kilowatt Lincoln Demand Meters in paired sockets correlate kvar and kw data.



SM55-A

Quick Catch-up

Inspectors

Fiftieth anniversary of L. John Christensen's entry into the electrical business was celebrated appropriately at the Utah Chapter, International Association of Electrical Inspectors, Dec. 5 meeting at General Electric Supply Co. auditorium. Some 90 attended, coming as far as 175 miles away to pay honor to the one-time Salt Lake City electrical inspector, later teacher at West High School. A. E. Fleming, G-E Supply, and Loran M. Christensen, present Salt Lake City chief inspector, spoke highly of Christensen's standards and principles. J. Hyde Stayner, likewise a co-founder with Christensen of the Utah Chapter, presented a framed life membership certificate and the chapter's gift of a Swiss watch.

IAEI

With regret from everyone in the Southwestern Section, IAEI, H. G. Ufer withdrew as a candidate for international president and likewise as a member of the executive council from the Southwestern Section. Ufer had been first vice-president and hence in line for the presidency this year. However, upon his retirement from Underwriters' Laboratories, he became a consultant and as such no longer an active inspector.

When the technical question was raised as to his eligibility, Ufer, who had previously discussed the matter with IAEI officers and thought the matter decided favorably, withdrew rather than subject his well-loved organization to criticism. For more than 25 years in the Pacific Coast area, he has been one of the staunchest advocates of the IAEI and served as secretary of the Southwestern Section for more than 10 years. He was with Underwriters' Laboratories 43½ years. Likewise, he was chiefly responsible for the formation of the Hawaiian, Arizona, Nevada and a former Imperial Valley Chapter.

A special executive committee meeting of the section was called by President James L. Ambrosi Nov. 25 in Los Angeles. At this meeting Ufer's withdrawal was accepted with regret and his vacancy on the executive council was filled by L. O. Trim, chief inspector at Burbank. Jesse Ross of San Bernardino was nominated as alternate.

At the same meeting, Frank C. Jones, vice-president, Phoenix, was appointed chairman of the code panel correlation committee, Barney Alverson, San Bernardino County, chairman of the educational committee, and Chester H. Hefner, third vice-president, San Mateo County, chairman of the membership committee. Ernest L. Nelson was appointed chairman of the fire reports committee, succeeding Harry L. Dobson, Santa Barbara, who had retired.

Christensen Stayner

Puget Sound Chapter, IAEI, elected new officers and discussed plastic ceiling diffusers, glass panel heaters and trailer wiring at its Olympia, Wash., Dec. 9 meeting with Chairman E. M. Tubbs of Bellingham presiding. P. L. Disney, Bremerton, was appointed the new chairman for 1956 with Fay Hudson vice-chairman, M. G. Girard treasurer and C. S. Alger secretary. T. M. Widrig, D. G. Gawne and M. G. Girard were named to the executive committee. Ray Larrabee of Underwriters' Laboratories gave a talk and demonstration based on a paper by D. L. Breting of UL entitled "Pretty Pretty Plastics—Ugly Fires." He showed UL methods for measuring flame travel, fuel contribution and smoke components of plastic materials used in lighting systems. The glass panel heater discussion was over fires resulting from proximity of combustible materials, some explosions of glass panels and deterioration of fused panels connected to supply space heating. Trailer wiring problems were discussed at length with recommendations that the National Electrical Code give attention to the problem.

At the previous chapter meeting, held jointly with the Eastern Washington Chapter, Wenatchee, the feature was a talk by A. B. Martin of Washington Water Power Co. on "New Concepts of Electric Heating." He spoke of experiments with air wells as a heat source for heat pump applications with auxiliary electric heat built into the ducts or plenum chambers of furnaces. The next quarterly meeting is scheduled at Bremerton on March 2.

Southern California Chapter, IAEI, elected Arthur Vesco of San Diego as its chairman, succeeding Harry Dobson of Santa Barbara, now retired, Charles Metzger vice-chairman and E. V. Muller secretary-treasurer. A schedule of meetings for 1956 was adopted as follows: Jan. 25, Pasadena or Alhambra; March 28, San Diego; May 23, Long Beach; July 25, Santa Monica; Nov. 8, Anaheim. Rome Cable Corp. was host to the meeting and a tour of the conduit plant was made. The new specifications for the Pacific utilities electric service requirements heavy duty meter socket box were presented by Harold Welton of Southern California Edison Co. The new-type box will be acceptable for direct-connected meters where the service conduit does not exceed 2 in. and conductors are not larger than 3/0.

Honolulu Chapter, IAEI, heard a talk by Mr. Middleton of Underwriters' Laboratories Inc. at one of its recent meetings and for the November meeting met with the Pacific Coast Electrical Assn. in Honolulu. Code discussion was scheduled for the Dec. 14 meeting.

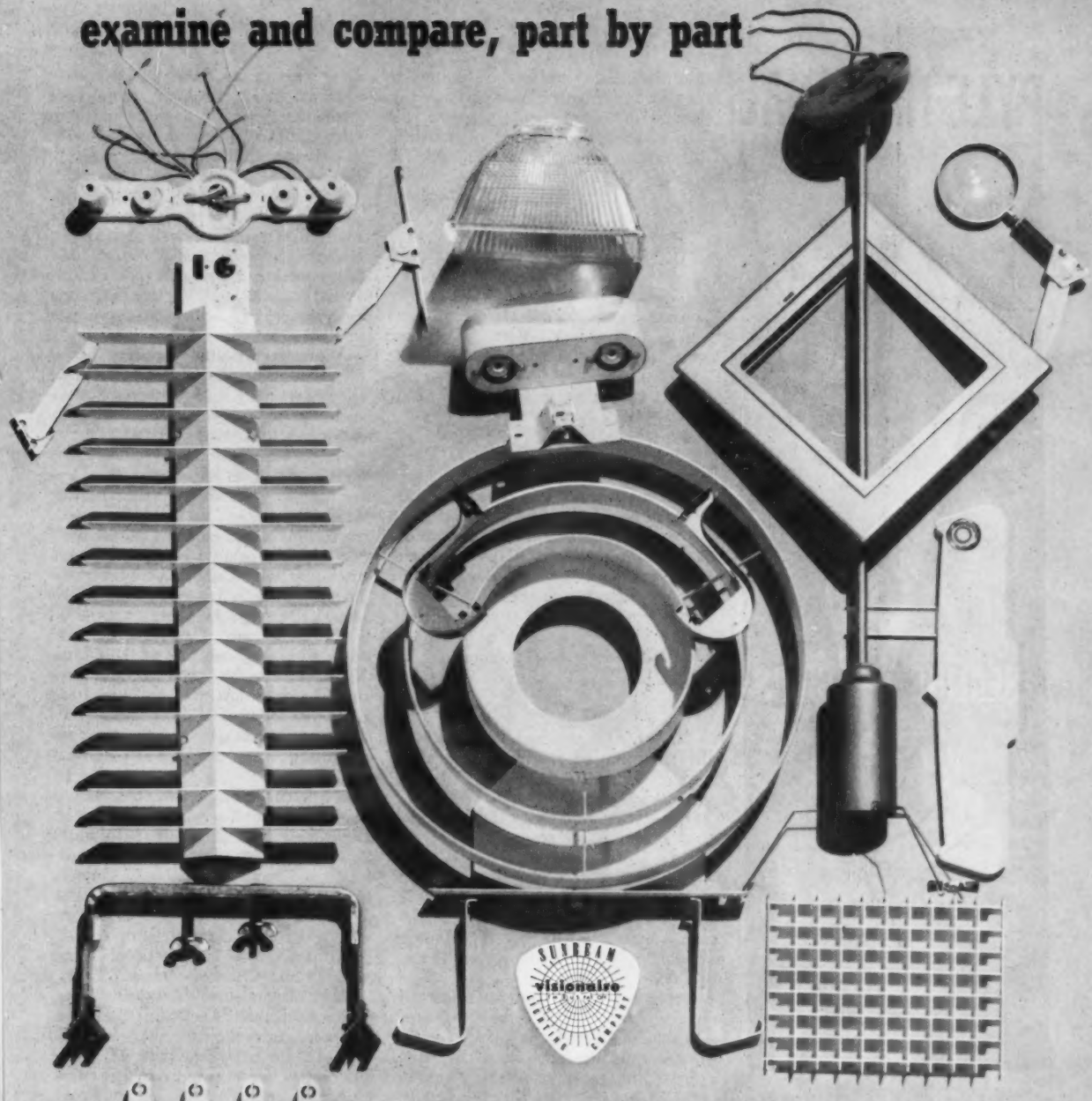
Central California Chapter, IAEI, heard Ray E. Colby, chief electrical inspector of Fresno, discuss the features of the new Fresno city ordinance at the Dec. 3 meeting held at Westinghouse Electric Supply Co. building in Fresno. R. V. Jones, chairman, presided.

Arizona Chapter, IAEI, met in Glendale, Ariz., Nov. 12. Discussion of a state enabling act and whether to incorporate into it all the building and plumbing codes as well, previously discussed at a former meeting in Prescott, was resumed.

Northern California Chapter, IAEI, met in the Alameda County building in Centerville Dec. 3 for a general code discussion. Proposed revisions to the National Electrical Code consumed most of the discussion period. Nick Bayer, Bussmann Mfg. Co., spoke on "Fuse Protection for Fluorescent Fixtures on 120/480-v Circuits." Next meeting will be held at Oakland, Jan. 28.

Electrical Inspectors' Assn. of B. C. has discussed in its recent monthly meetings the problems of grounding where plastic water piping is used, installation rules under the Canadian National Code of sectional ranges and range tops, and the limitations on multi-outlet plastic assemblies. The Canadian code puts a limit of two surface elements on one circuit and requires separate overcurrent protection for each circuit. The oven, likewise, requires a separate fusing. Use of the

examine and compare, part by part



We the engineers, designers, tool and die makers, welders, painters, assemblers; all of us at Sunbeam Lighting Company welcome with pride and confidence your critical examination of our work and products. Compare, part by part, a Sunbeam Visionaire® with another similar style and quality fixture. See for yourself our precision forming, clean welding, smooth, properly "aged" enamelling and other unexcelled examples of craftsmanship. Remember too, that only top grade steel and other materials are used in Sunbeam Visionaires® — and that all auxiliary electrical parts are E.T.L. tested and U.L. approved. Examine and compare. You will be convinced that quality Sunbeam fixtures are more economical in the long run.

Would you like to know how to *really* judge a good paint job on a lighting fixture? Write, on your letterhead, for a non-technical leaflet #EL18 on this subject.

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PROTECT EQUIPMENT ...REDUCE MAINTENANCE

- Keep out water and dirt
- Prevent wire terminal strains
- Reduce insulation wear
- Provide high mechanical strength
- "Dress up" deluxe mechanisms

Sizes ⅜-inch to 3-inch conduit, and ⅛-inch to 2⅜-inch cable.

Sold nationally through authorized distributors. Write today for Bulletin.

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multi-outlet assemblies is limited to dry locations and is not permitted in bathrooms or kitchens. Another rule limits the branch circuit overcurrent protection to 15 amp. At the Dec. 12 meeting G. Hyam of Economy Fuse & Mfg. Co. was scheduled to speak on the use of "Dual Element Fuses."

LAR

Los Angeles Chapter of the Representatives elected officers for 1956 as follows: president, Vern T. Rupp; vice-president, Norman J. Marshank; and Jackson Edwards secretary-treasurer. Executive secretary is Mal Mobley Jr.

NPPA

Accounting section of the Northwest Public Power Assn., meeting at Tacoma, elected Elmer Landin, auditor of Benton County PUD at Prosser, as chairman for the coming year. Brian Danby, deputy financial manager, B. C. Power Assn., was named vice-chairman. Next meeting of the institute will be held at Wenatchee.

IES

Plans for the regional conferences of the Illuminating Engineering Society in the West are beginning to take shape for the three Western regions.

The Pacific Northwest 1956 regional conference will be staged at the Davenport Hotel, Spokane, April 19-21 with John Ruffatto, vice-president and treasurer of Columbia Electric & Mfg. Co., as general conference chairman. Blair Plowman, Washington Water Power Co., is the regional vice-president.

Other committee appointments announced by Ruffatto are: assistant general conference chairman, Joseph M. Doyle, consulting electrical engineer; chairman of papers committee, D. E. Mozes, General Electric Supply Co.; publicity committee, George E. Romans, Washington Water Power; registration, Theodore Beadle, Washington Water Power; properties, Walter Haspedius, Columbia Electric & Mfg.; finance, Edward E. Ralph, same company.

The Intermountain regional conference will be held in Salt Lake City, sponsored by the Utah Section. The Utah Hotel will be convention headquarters April 26-28. Sigurd A. Blomquist of Midvale is chairman of the Utah Section and is readying committees for the affair.

The South Pacific Coast conference at the Mark Hopkins Hotel, San Francisco, April 11-13, has its plans further along than the others. Golden Gate Section will be host to the conference with James E. Barnes as general chairman; Harold A. Wright, chairman of the section as vice-chairman; Charles D. Buchanan, second vice-chairman; John Keyes, Benjamin Electric Mfg., finance committee; John S. Walsh, PG and E, papers and program; Frank Duhme, Smoot-Holman Co., reception and registration; Robert L. Sawyier, PG and E, Oakland, hotel and arrangements; Charles W. Macy, PG and E, San Francisco, attendance, publicity and conference secretary.

Vancouver Island Chapter, IES, in Victoria, B. C., under Chairman A. C. F. Evans, held a "Forum on Fundamentals" at its Nov. 28 meeting. R. Taylor, optometrist, spoke on "Fundamental Functions of the Human Eye," C. Waggett, Oak Bay electrical inspector, on "Definitions of Illuminating Terms," J. F. Pye, Victoria City Lighting foreman, on "Lighting Standards," K. Reid, Victoria street lighting superintendent, on "Conversion of Electrical and Illumination Quantities," G. Douglas, design engineer, provincial government, on "Instruments and Measurements," and A. C. F. Evans, Victoria Machinery Depot, on "Design Elements." At the Jan. 23 meeting Lance Robson, chief electrical inspector, Province of B. C., will speak on "Lighting and the New Electrical Code."

Southern Colorado Chapter, IES, at Pueblo had a panel discussion session Dec. 6 at the Southern Colorado Power Co. auditorium. William Proudfoot, new chairman, Pueblo Ordinance Depot post engineer, presided. The panel consisted of Joseph H. Edwards, Pueblo Electric Supply, Ralph Herman, Stephan & Lambert Co., Kenneth J. Stines, architect, and E. H. Pemberton, Southern Colorado Power Co., with Charles D. Bell of the same company as moderator. Subject was "What Does Good Lighting Mean to Distributor, Contractor, Architect and Utility?" Bob Even, Southern Colorado Power Co., is the new secretary-treasurer.

Utah Section, IES, heard Salt Lake City's safety commissioner, Lyle B. Nicholes, speak of that city's lighting program at its regular December meeting at Hotel Newhouse.

Oregon Section, IES, heard Marshal B. James of Northwestern Agencies demonstrate and speak on decorative lighting for the holidays on Dec. 14. Donald W. Edmundson, an architect, is now chairman of the section. George Smith, G-E Supply Co., reviewed an article from the November *Illuminating Engineering.*

San Diego Chapter, IES, likewise featured garden lighting at its Dec. 1 meeting in the Electric Building with D. C. Bertrand, G-E Supply, as eve-

ning chairman. William Shalda, Shalda Mfg. Co., Burbank, gave an illustrated talk. At the previous meeting, Bill Jones, research engineer for Smoot-Holman Co., reviewed a wide range of problems with fluorescent lighting.

Arizona Chapter of IES had a panel discussion on store lighting for its Dec. 14 meeting. Four of its members participated with a cross question period from the floor. At the previous Nov. 8 meeting William Shalda of Los Angeles discussed outdoor floodlighting and decorative lighting.

Southern California Section, IES, will have an exchange speaker from the Golden Gate Section, John Walsh, Pacific Gas and Electric Co., San Francisco, at its Jan. 4 meeting. H. S. Davis, Western sales engineering manager of American Electronics, and Bill F. Jones, research engineer, Smoot-Holman Co., will discuss the pros and cons of high frequency fluorescent lighting. At the Dec. 7 meeting Robert Feuerhelm of Kim Lighting, Altadena, gave an illustrated talk on "Lighting Your Garden or Patio." It was ladies' night and the entertainment was supplied by Jan Rubini, violinist.

Golden Gate Section, IES, relinquished the territory of San Joaquin County to the jurisdiction of the Mother Lode Chapter in Sacramento. At its Nov. 18 meeting a tour was made of the Prescolite Mfg. Corp. plant and offices in Berkeley with a dinner at Spenger's following. W. A. Cyr, ELECTRICAL WEST, ribbed current fashions in residential lighting in a talk entitled "A Home Is Not a House." Stan Haywood, Prescolite, discussed application of modern lighting fixture types to residential lighting.

Mother Lode Chapter of IES, Sacramento, joined with the Golden Gate Section in a visit to the Prescolite plant in Berkeley. For its Dec. 19 meeting, a visit was made to the State of California's new employment building to see the lighting and IBM equipment.

San Jose Chapter, IES, heard George Leyes and James Burson, Westinghouse Electric Corp., discuss and illustrate "Latest Developments in Outdoor Floodlighting of Parking Areas for Shopping Centers, Industrial Outdoor Areas and Used Car Lots." This was at the Nov. 23 meeting at the De Anza Hotel.

British Columbia Section, IES, in Vancouver, B. C., held its annual Christmas banquet at Canyon Gardens on Dec. 8. At its last regular meeting, Nov. 17, a discussion group subject was "Street Lighting in Vancouver" by Lorne Ryan, Vancouver city electrician, followed by a discussion of "Lighting Down on the Farm"

Smooth "Pulley Action" Wireway Prevents Conductor Chafing
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Large 1" x 7/8" Hole
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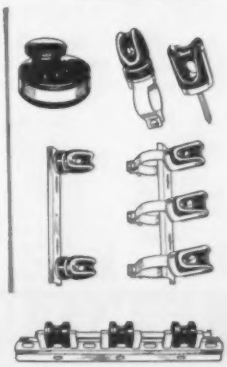
Where *quality* and *performance* are necessary for continuous line service—Porcelain Products wireholders and secondary service materials *assure* reliability. They're engineered with strong, sturdy construction—metal in tension, porcelain in compression. Steel parts are hot-dip galvanized . . . screw threads are extra sharp, lubricated for ease of installation. Larger, pulley-action wire hole, for large wire sizes—prevents chafing, wire wear.

These EXTRA features—*plus*—Porcelain Products "Quality Line" reputation, make an unbeatable combination . . . SPECIFY PORCELAIN PRODUCTS wireholders and secondary service materials.



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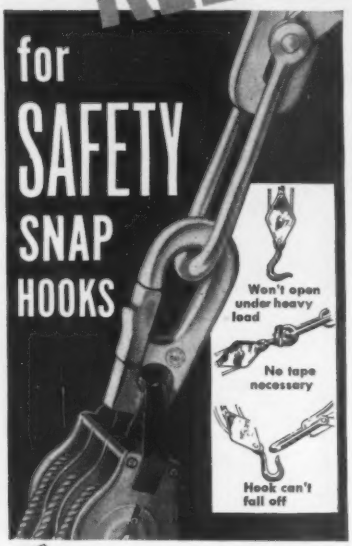

455 Solid Eye

Here's strength, safety on heavy loads—for blocks, tackles and hoists. Klein Safety Snap Hooks are time savers, too, eliminating the necessity of taping or wiring the throat. Made of drop forged steel—carry a working load of 8,000 pounds with adequate safety factor. Snap on easily with one hand—may be used on any conventional steel block 6 inches or smaller, or on chain hoists or snatch blocks. Four types regularly available. Specify 455-SH-3 Snap for use with 1½-ton hoists . . . No. 455-SP for double chain hoists and for attachment at housing. Klein can also supply safety snap hooks for lighter loads.

455-S Swivel Eye

455-SH Swivel Eye

Foreign Distributor: International Standard Electric Corp., New York

455-SP

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Write for your free copy of the Klein Pocket Tool Guide today!

Mathias KLEIN & Sons
Established 1857 Chicago, Ill., U.S.A.
1200 McCORMICK ROAD • CHICAGO 45 ILLINOIS

Graduating 27 of the second Certified Lighting class conducted by Contractors Division of San Diego Bureau of Home Appliances; their instructors are in the back row right

by James A. MacCarty, farm services supervisor for the B. C. Electric Co. Ltd.

ECD

Electrical Contractor Division of the Bureau of Home Appliances of San Diego County graduated 27 from its second certified lighting class held during the months of September, October and November. Seven sessions in all were held and class attendance record was 96.4%. Tentative plans call for another class to start sometime in the month of February 1956 and refresher classes will be organized and held during the year for the graduates of the other two classes. In November, already 24 applications had been processed for jobs to be certified and the base of applications for certification is accelerating.

RMEL

Dates for the annual spring conference of the Rocky Mountain Electrical League at the Shirley-Savoy Hotel, Denver, have been set for April 29 to

1956 Assocation Meetings Scheduled

February

6-10—**Winter Market**, Western Merchandise Mart, San Francisco

March

22-23—**Pacific Coast Electrical Assn., Engineering and Operating Section**, Sheraton-Palace, San Francisco

April

5-7—**Electrical Maintenance Engineers of So. Calif., Industrial Show**, Shrine Auditorium, Los Angeles

11-13—**Northwest Electric Light & Power Assn., Engineering and Operating Section**, Hotel Vancouver, Vancouver, B. C.

11-13—**Institute of Radio Engineers**, regional conference, Hotel Utah, Salt Lake City

11-13—**Illuminating Engineering Society**, South Pacific Coast Region conference, Hotel Mark Hopkins, San Francisco

17-18—**PCEA, Administrative Services Section**, Sheraton-Huntington, Pasadena

19-21—**IES**, Pacific Northwest Region conference, Davenport Hotel, Spokane

26-28—**IES**, Intermountain Region conference, Hotel Utah, Salt Lake City

29-May 1—**Rocky Mountain Electrical League**, spring conference, Shirley-Savoy Hotel, Denver

May

3-5—**National Electrical Contractors Assn.**, District 6 & 8 conference, Hotel Utah, Salt Lake City

14-16—**PCEA**, annual convention, Las Vegas

21-23—**NWEL&PA, Business Development Section**, Benjamin Franklin Hotel, Seattle

21-23—**NWEL&PA, Accounting & Business Practice Section**, Portland

June

25-29—**American Institute of Electrical Engineers**, summer and Pacific general meeting, San Francisco

October

7-10—**RMEL**, annual convention, Broadmoor Hotel, Colorado Springs

BUMBLE BEES CAN'T FLY

Physicists and Aerodynamic Engineers have been mystified for years by the flight characteristics of the common bumble-bee. According to their calculations, the bee should never be able to leave the ground. His mass, his wing-spread and his muscular development all added together in a mathematical manner positively prove that he can't take off. Nevertheless, there he is, in the air, buzzing merrily about with a heavy pay-load of honey.

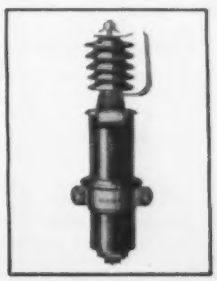
So it is evident that some mathematicians must be wrong. They are like the man who stood looking at the giraffe while saying, "There is no such animal." The same is true of some manufacturers, especially in the lightning arrester field. You have doubtless heard much theory, sincerely propounded, some mathematics and considerable test data, all designed to prove that expulsion type lightning arresters are impractical, won't work and are unsafe. *Some* expulsion designs have failed. *Many* valve types have failed.

Some designers are smarter, or luckier, or better mathematicians than others and their products succeed where others do not. Call it what you will, over a million Autogaps are on the lines, out-performing, out-testing and out-protecting every other design in existence, and have been doing so for 15 years. Autogaps are the only arresters carrying a 5-year warranty.

Can we believe what we can see or must we still say that, "Bumble Bees Can't Fly!"

HUBBARD AND COMPANY

Pittsburgh 1, Pa.
Chicago 50, Ill.
Oakland 8, Cal.



ELECTRICAL WEST . . .

What its Readers buy . . .

Everything a utility needs to generate, transmit, distribute and sell electrical energy, plus design, construction and maintenance services.

Every kind of electrical construction equipment needed in industrial, commercial and residential construction, including built-in devices such as lighting, electric heating, etc.

Power consuming equipment sold through electrical and appliance wholesalers—everything from motors to traffic appliances.

The Magazine . . .

ELECTRICAL WEST has served the entire electrical industry in the 11 Western States for 70 years. Over 10,500 subscribers, offering unparalleled coverage and penetration at all levels of a $1.2 billion annual market:

. . in Utilities

6,466 subscribers, covering nearly all of the 443 electric service systems in the West. Reaching management, engineering and operating personnel including extensive coverage at line foreman level. **More than twice as many Western utility subscribers as the national utility magazines!** Western utilities will add new generating, transmission and distribution capacity at the rate of $800 million a year through 1965 and beyond.

. . among Electrical Contractors

1251 subscribers, concentrated among firms with 4 or more employees, doing the bulk of the estimated $350 million annual electrical construction and maintenance work of the West.

. . among Electrical Wholesalers

371 subscriptions in over 230 establishments handling the wiring devices, apparatus, materials and appliances installed by the electrical contractor.

. . among Consultants and Engineers

638 subscribers in consulting engineering and construction firms large and small doing work for private, municipal and Federal utility systems, for private industry, and on defense projects.

. . among Electrical Manufacturers

1,132 subscribers in management, sales organizations and Western production facilities of electrical equipment manufacturers.

. . in Industrial Plants

295 subscribers doing electrical engineering and maintenance work in Western industrial and commercial operations of various kinds.

The Market . . .

The Western electrical market is growing about 30% faster than the national average. Because it covers nearly 40% of the land area of the U. S. extra advertising effort is essential to adequate sales coverage.

Current studies by Stanford Research Institute, by McGraw-Hill Department of Economics, and by ELECTRICAL WEST show that in the entire West expenditure for new electric power facilities will be at an annual rate exceeding $800 million for the next 15 years; industrial, commercial and residential electrical construction equipment installed by electrical contractors and industrial plant electrical departments will exceed $350 million annually. This growth reflects population growth that is stimulating a tremendous flow of electric utilization equipment and appliances through Western wholesaler and trade channels.

Readership Research . . .

Readership traffic surveys are made regularly by ELECTRICAL WEST. These prove the great "cross interest" in industry subjects by subscribers in all parts of the industry and demonstrate the soundness and necessity of ELECTRICAL WEST's editorial approach and broad circulation.

These reader studies also measure advertising readership. Advertisers can test copy approaches, get a measure of the effectiveness of their printed sales messages, compare the degree of interest in various products by different segments of the audience. Three studies are scheduled for 1956. Issue dates on request.

Reader Preference . . .

Independent reader preference studies made by national and Western electrical companies over their own customer and prospect lists consistently **show ELECTRICAL WEST equal to or ahead of national magazines in this area.**

Electrical . . .

Advertisers recognize the value of ELECTRICAL WEST. 233 advertisers of electrical equipment apparatus and supplies ran a total of 1101 pages in ELECTRICAL WEST in 1955.

ELECTRICAL WEST

A McGRAW-HILL PUBLICATION

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May 1, according to Ralph B. Hubbard, manager. The annual fall convention, instead of being held in September as previously announced, will be held Oct. 7-10 at the Broadmoor Hotel, Colorado Springs.

EMEA

Electrical Maintenance Engineers Association of Southern California made a special program of code discussion for its Dec. 15 meeting. Mike Wintz, senior electrical inspector for the city of Los Angeles, was asked to point out how the new code affects the maintenance man. He did so with slide illustrations to explain changes in the new code. Open discussion with questions and answers followed the preliminary talk. Also announced were preliminary plans for the EMEA electrical industry show at Shrine Exposition Hall April 5-7. The November meeting heard a talk by W. J. Laughlin, district manager, Thor Power Tool Co., who discussed the servicing and care of portable electric tools.

IEA

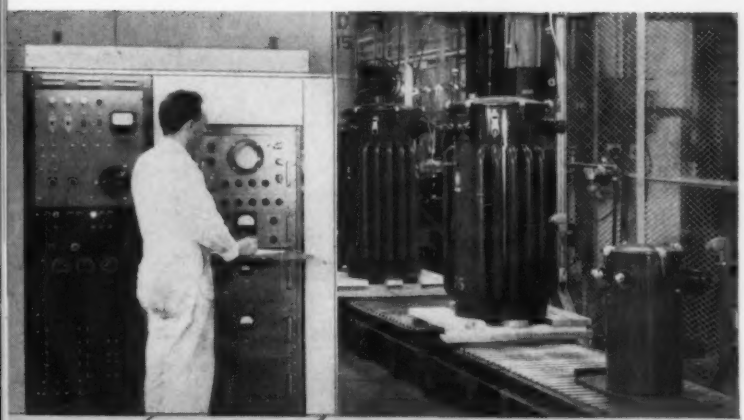
It was election time in December for the Intermountain Electrical Assn. with headquarters in Salt Lake City. Two candidates for each of the offices of president, vice-president and secretary-treasurer were on the slate. Ernest D. Schettler, former Westinghouse man and now a contractor, and Owen H. Thomas, Salt Lake Hardware Co., were presidential candidates; G. Bennett Larson and Tom Anderson, both of whom are executives of KDYL radio station, Salt Lake City, vice-presidential candidates. For secretary-treasurer the candidates are Amos V. Bronson, G-E Supply Co., and Carlos W. Stone, former manager of the association and now a manufacturers' representative. Results of the letter ballots had not yet been announced.

NISA

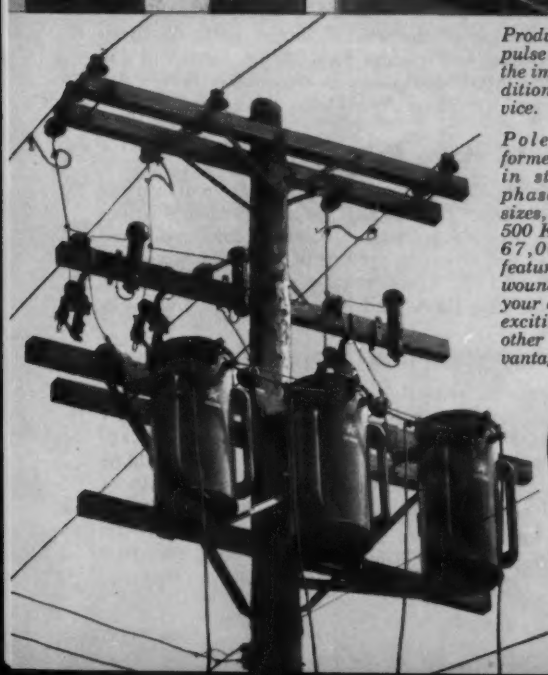
Puget Sound, Oregon and British Columbia Chapters of National Industrial Service Assn., the motor shop organization, held a joint meeting in November at the Multnomah Hotel, Portland. Speakers for the one day conference and another of shop tours included: Al Kuder, K&N Electric Motors, Spokane; Walter Harmier, Center Electric Engineering Co., Tacoma; August Cerdurmen, Skeen Electric Works, Portland; Jake Reed, Reed Electric, Portland; and W. O. Helwig, Helwig Co., Milwaukee. Subjects included single-phase motors, selling power tools, d-c carriage drives, making customers of industrials and carbon brush applications.

"You're wastin' your time, Doc...

those Pole Star transformers were all IMPULSE TESTED at the factory!"



Production line impulse tests simulate the impulse surge conditions of actual service.



Pole Star transformers are available in standard single phase distribution sizes, from 3 through 500 Kva, 480 through 67,000 volts. All feature the patented wound-lapped core — your assurance of low exciting current and other important advantages.

The man is right, Doc! And you can bet your stethescope those Pole Stars are right, too. You see, Pennsylvania's production line impulse testing — standard procedure for all units from 3 through 100 Kva, 18 Kv and below — makes certain that Pole Star transformers are just as dependable as the name implies.

At Pennsylvania, impulse testing is performed after the units have passed all required ASA and NEMA tests. Transformers are tested *without arresters* — being subjected to impulse voltages that are higher than the basic impulse insulation levels required by ASA and NEMA standards. Since tests are made between layers and turns as well as to ground, these production line tests simulate the impulse surge conditions likely to occur throughout the entire transformer during actual service.

The apparatus used for detecting failures during these tests is so sensitive that it will disclose *even* a one-turn high voltage short circuit. Such rigid quality control means added years of trouble-free service with Pole Stars, and important reductions in maintenance.

Distribution Sales Department

Pennsylvania Transformer Company

A McGraw Electric Company Division

CANONSBURG, PA. • *Greater Pittsburgh Distric*

THE MONTH IN BRIEF

PG and E Reduces Some Rates

Customers in unincorporated areas of California served by Pacific Gas and Electric Co. will receive the benefits of a $556,440 rate decrease announced in December. The decrease applies in areas where population densities have increased, and affects about 49,000 customers, 20,500 electric and 28,500 gas.

Canada Gas to Be Imported

The Federal Power Commission has authorized Pacific Northwest Pipeline Corp. to construct and operate gas pipeline facilities for the transportation and sale of natural gas to be imported from Canada. The gas will come from the Peace River area of Alberta and British Columbia.

Power Commission Cleared by AEC

The Washington State Power Commission has been granted a permit by the Atomic Energy Commission for access to nuclear technology, according to J. Frank Ward, managing director of the state commission. "In view of the power commission's interest during the last year and a half in the development of steam generated energy to supplement the hydro power supplies of the Northwest and the generally accepted opinion that considerable quantities of thermal generation may be required in 10 years or so," Ward said, "the possibility of applying nuclear energy sources becomes a matter of general concern to the people of the area."

PG and E Battles Storm Outages

Pacific Gas and Electric Co. crews worked day and night in rain and high wind in attempts to maintain service in storm-struck northern California areas in late December. Principal source of trouble was wind damage to distribution lines causing local outages. Although eight hydro power houses were out of service, half of them flooded, generating capacity was not seriously impaired. Reports are that 132 reservoirs, including those emptied for the winter, were filled to overflowing. Construction on the company's Poe project was completely halted, with much equipment lost and an intake tunnel filled with water and bridge washed out.

Crows Seek Rent from Yellowtail

Robert Yellowtail, a former Crow Indian Council chairman, says the Crows will appeal to the Secretary of the Interior if the Bureau of Reclamation attempts to take tribal lands in southern Montana for construction of the proposed Yellowtail Dam without adequate compensation. The council will ask $1,000,000 annually for use of the land and an access road.

Tacoma Sets Consumption Record

Consumption of electricity in Tacoma, Wash., passed the 2,000,000,000-kwh mark Dec. 23 to set a new record for any single year. This year's consumption is more than 10% higher than in 1954.

BPA Will Wheel Box Canyon Power

The way has been cleared to move power from Washington's Box Canyon Dam via Bonneville Power Administration lines to Seattle under a proposed 20-year wheeling contract now being considered by Seattle City Light. Box Canyon is owned by Pend Oreille PUD.

Vennard Will Head EEI

Edwin Vennard, president of Middle West Service Co., Chicago, has been named to succeed Col. Howard S. Bennion as vice-president and managing director of Edison Electric Institute. Bennion retires June 1 and Vennard joins EEI about March 1. Vennard is a well known consultant on public utility economics, new business, rates and public and employee relations.

HECO to Add to Generation

Hawaiian Electric Co. directors have approved plans to add a 50,000-kw unit to Ala Moana station to bring the capacity to 100,000 kw. At the same time, plans for another 50,000-kw unit are being discussed.

Warm Springs Indians Accept Rent

Portland General Electric Co.'s proposal to build a dam on the Pelton site of the Deschutes River has won acceptance of members of the Warm Springs Indian tribe, who will share rentals the company will pay for land. FPC and Interior Department approval is still pending, plus anticipated acceptance of revised fish protective facilities.

Permit Sought for Lewis River Dam

Pacific Power & Light Co. is planning a spring start on the $58,700,000 Swift Dam on the Lewis River if FPC approves a license application made recently. The dam will be one of the world's largest earth-fill structures, according to President Paul McKee, and will add 256,000 kw installed capacity in two power houses upstream from Merwin and Yale Dams.

Eugene to Have Rate Cut

The Eugene, Ore., Water & Electric Board will institute new rates about Feb. 1 that bring about reductions amounting to 20% to some industrial customers. Residential bills will be cut an average of 8% and commercial billings about 13%. The new rates are more competitive with neighboring REAs and Pacific Power & Light Co.

Funds for Wyoming Project Asked

Sen. Frank Barrett (R-Wyo.) says he plans to ask the Bureau of Reclamation to recommend appropriation of about $20,000,000 for construction of the Fremont Canyon power plant in central Wyoming. The plant would be located about midway between Alcova and Pathfinder Dams. The bureau was authorized to spend $200,000 during the current fiscal year for preliminary work on designs for the project and $50,000 for initial construction of a power line from Alcova to the Canyon site.

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THIS MONTH'S NEWS

Eugene May Separate From NW Public Power

Eugene, Ore., Water & Electric Board members are giving consideration to withdrawal from the Northwest Public Power Assn. Talk of separation started when NPPA intervened before FPC protesting Mountain Sheep and Pleasant Valley construction by investor-owned utilities.

Ray B. Boals, general superintendent of EW&EB, told ELECTRICAL WEST he came to the conclusion to urge withdrawal after the Dec. 1 NPPA trustees' meeting. He said he had protested the political activity and asked that the association return to its original purpose of exchanging technical and management ideas for more efficient utility operation.

"But we didn't even get halfway to first base," Boals said. He added that he had support from Vivian B. Jones, Tacoma City Light, and others at the meeting.

Eugene is not the only utility taking objection to NPPA policy. Wahkiakum PUD No. 1 of Washington is known to have warned the organization it would withdraw unless policy was reoriented to meet changing conditions in the regional power situation and national power policy.

Other strong dissenters to the NPPA "all-federal development" views include Seattle, Tacoma, Forest Grove and Mason County PUD, though none are credited with threatening withdrawal.

NPPA was originally organized by Seattle, Tacoma, McMinnville and Eugene municipal utilities to exchange data on rates, engineering and management problems. Boals said, "In these fields the NPPA has rendered a valuable service to its members." But since "advent of the federal interests in the Northwest there has been a very considerable increase in the number of publicly owned utilities in the Northwest. They now not only include municipalities but PUDs and REA groups. These groups were eventually invited to become members of the association. Each utility, regardless of its kind, has problems in common insofar as operations and engineering are concerned.

"It may be that their political problems actually have more in common than most utilities suspect. However, there is a great difference between them where ideas and ideologies are concerned. There is also a considerable disagreement in the evaluation of the preference clause and its ramifications."

Unusual Finance Plan To Build Priest Rapids

Glenn Smothers, manager of Grant County PUD, Ephrata, Wash., recently revealed the PUD's financing plans for the proposed Priest Rapids project on the Columbia River.

Financing plans are based on contracts for sale of the power and these are unusual in that they will be for percentages of the project's entire capacity, rather than for a given number of kilowatts.

The PUD is required by law to sell 35% of the 1,200,000 kw capacity outside Washington State so purchasers in Oregon, Idaho and Montana are being approached. Axel Strom, director of utilization for the PUD, predicted in a speech that half the power would eventually be used in the immediate vicinity. In the contracts, the PUD reserves the right to reduce the power allocations to any purchaser by as much as a third with five years notice.

The PUD plans to continue receiving its own power supply from Bonneville Power Administration, at least until 1965, which leaves all of the Priest Rapids power available for contract. The BPA power is cheaper than Priest Rapids power will be.

Smothers said the PUD expects to call bids about Feb. 1 and open bids about March 1 for construction of Priest Rapids Dam. He said the PUD expects to have contracts for the entire capacity of the project by the time bids are called. Power deliveries would start in 1960 from Priest Rapids Dam and two years later from Wanapum Dam.

• **Southern California Edison Co.** has filed with the California Public Utilities Commission for exemption from competitive bidding on a proposed new issue of preferred stock. Proceeds will be to retire bank loans and for new construction. The new series is to be issued during the first quarter of 1956.

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Subcommittee Touches Three Western Cities

A House subcommittee on water resources and power, headed by Rep. Robert E. Jones (D-Ala.) holding hearings in Denver, Los Angeles and Portland last month heard several reactions to Hoover commission proposals.

Thomas G. Bonar, president of Union Rural Electric Assn. in Colorado, charged that the Hoover commission report "is a direct intent to destroy rural electrics by doing away with cooperatives and preference customers."

Bonar earned a quick rebuff from Committeeman Glen Lipscomb, California Republican, when the cooperative president accused investor-owned electric utilities of using "communistic tactics" in national advertising. Bonar later retracted the statement.

The subcommittee was told by Ward Bannister, Denver attorney, that Bannister had the personal word of Herbert Hoover himself that the task force did not oppose the Colorado River project.

In Portland the committee heard Ernest R. Fatland, former Oregon state senator, explain the details of the partnership plan for development of John Day site on the Columbia River. He presented a theory that privately operated hydroelectric plants on the Columbia might serve as "yardsticks" to measure the efficiency of federal plants. He argued that the governmental economy recommendations of the Hoover report were vital to avoid disaster.

A big issue in the Portland hearings was the Hoover-recommended "users tax" on barge and tow operations to offset government navigation development costs. Vigorous opposition to the proposal was stated by Sen. Wayne Morse, Sen. Richard Neuberger and E. W. Johnson, representing Inland Navigation Co., Portland. Morse and Neuberger placed blame for the navigation recommendations on investor-owned utilities.

Allan Smith, attorney for Pacific Power & Light Co., who was heard longer than any other witness, told the whole story of private utility cooperation with the federal government dating back to the beginning of Bonneville and Grand Coulee when PP&L and other companies went on record with endorsement of the projects and pledges to pass any resulting savings along to their customers.

Smith declared further, in respect to partnership proposals:

"We submit that to get this job done will require the effort and tax the resources of every agency involved, public, private and governmental. It should be a mutual undertaking and recognize the effort needed to meet the power requirements of the area."

In Los Angeles, William S. Peterson, general manager of Los Angeles Department of Water & Power, voiced strong objection to the Hoover recommendation that government power rates include an amount based on federal taxes paid by private utilities.

Peterson said acceptance of this provision would double the rates at Hoover Dam, but this was denied in a rebuttal by Julian Hinds, member of the task force, who said the recommendation would not "be retroactive to impair long-established contracts for projects already completed. It would have no influence whatever on the rates charged for Hoover Dam Power under present contracts."

• **California Electric Power** Co. and Local 543, IBEW, have signed a contract providing for a 3% general wage increase with additional increases for skilled workmen in various job classifications. It is in effect until Dec. 1, 1956.

Susanville, Calif., became the first community in the state to have fluorescent street lighting for its main street (above). The new luminaires, though fewer in number, have a light output about six times greater than the fixtures that were replaced. In the photo at right, Mayor Carl Lewis addresses a group of city and county officials at a dinner in honor of the occasion. In the photo, left to right, are D. A. Rice, General Electric Co. sales engineer, who sold the fixtures; A. U. Zimmerman, manager of the local California-Pacific Utilities Co. office, and Mayor Lewis. Main Street has 18 fluorescent fixtures and bordering school and residential areas 17 mercury-vapor fixtures

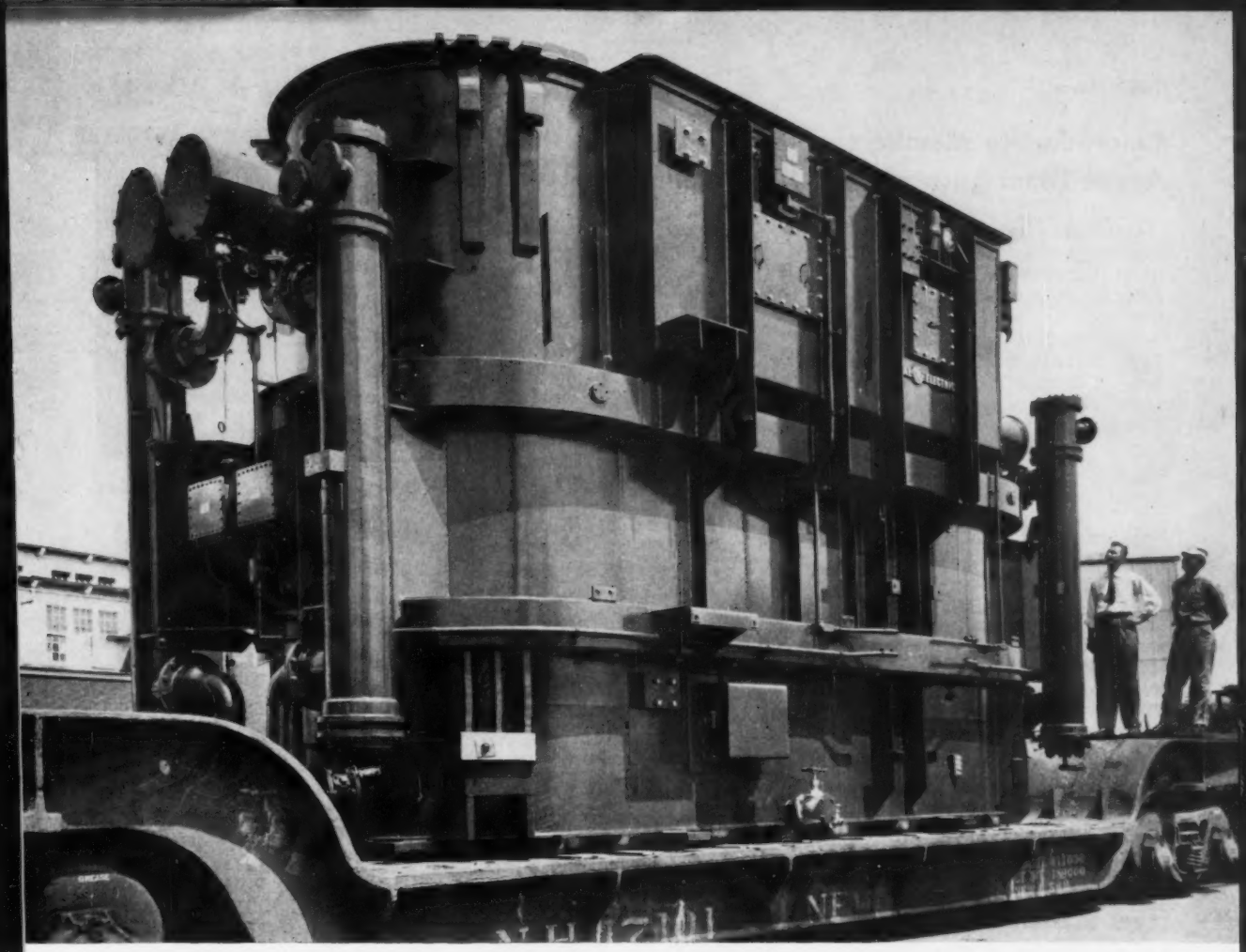
G-E Seeks Zoning for California Facility

General Electric Co. is getting a green light from Alameda County, Calif., authorities for construction of its proposed $5,000,000 atomic research and development center near Pleasanton.

Members of the county board of supervisors have recommended zoning the area for industrial development and asked the planning commission to approve the zoning.

Construction is expected to begin in the spring.

• **The evaluation** of power facilities and water investments of San Francisco's Hetch Hetchy system shows that water facilities are worth about $57,760,000 and power facilities about $31,033,000. The study was made for electric rate base determinations and greatly changes former evaluations of $81,600,000 for water facilities and $6,700,000 for power. Rates based on new evaluations would return 4.35%.



LARGEST FOW TRANSFORMER PROVIDES IMPORTANT SAVINGS

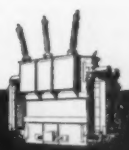
A midwestern utility realized important savings when it purchased this General Electric 275,000-kva, 132-kv, FOW (Forced-Oil-Water-Cooled) power transformer. Shipped late last year, this unit is believed to be the largest of its type ever built.

The savings were:

1) Reduced first cost. The price of this FOW transformer was less than that of like-rated units with any other type of cooling. The total annual cost, including the evaluation of losses, is also lower.

2) Reduced installation cost. All cooling equipment was shipped in place. Only moving to site, oil filling, plus installation of water connections and bushings were necessary before energizing. Upright shipment in a one-piece tank speeded handling.

Where adequate water exists, the economics point to increased use of FOW transformers. For further information on these units, contact your G-E Apparatus Sales representative or write to Section 421-38, General Electric Company, Schenectady 5, N. Y.



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Colorado-Ute Members Argue Plant Location

Colorado-Ute Electric Assn., an organization of four REAs, is having internal troubles over the selection of a site for its proposed generating station.

Directors of two member REAs, La Plata Electric Assn., Durango, and Empire Electric Assn., Cortez, have voted to withdraw from Colorado-Ute if plans to locate the plant at Nucla are carried out. The two also demanded the resignation of Frank Meaker as head of Colorado-Ute because of his recent charge that Colorado-Ute had been forced into a "shotgun wedding" with Western Colorado Power Co., which will operate the co-op plant if it is constructed. The two REAs said Meaker's charge "is entirely unfounded."

Meaker has said that he has no intention of resigning and pleaded for harmony among the four REAs.

Objection to the Nucla location of the plant is based on the closer proximity of Durango or Cortez to coal supplies.

The two other REAs in Colorado-Ute are San Miguel Electric Assn. and Delta-Montrose Power Lines Assn.

New British Columbia Hydro Project Planned

Moran Power Development Co., British Columbia, is planning a $500,000,000 hydroelectric project at Moran on the Fraser River.

A single dam in the project would rise 720 ft and create a lake extending 165 miles north towards Quesnal. It is reported that power facilities would generate 2,700,000 kw, more than is presently generated in all the province.

Opposition to the project is expected from fisheries interests who maintain the project would almost wipe out the Fraser salmon run. Objections were stated by Federal Fisheries Minister James Sinclair, who said his department was "unalterably" opposed to development of the Fraser.

• **The Waikiki Improvement** Assn. of Honolulu is working strongly to have some utility lines placed underground. Directors of the organization have focused their attention on Kalakaua Avenue from the Ala Wai Canal to Kapilolani Park and the Hawaiian Electric Co. facilities there. Trolley lines there are due to be removed in 1957. Cost may be borne by special assessment against property owners.

WWP Purchases PUD After Telling Vote

Washington Water Power Co. has paid the $2,905,000 purchase price and officially taken over facilities of the Stevens County PUD, Colville, Wash.

WWP then promptly reduced rates to about 2,300 former PUD customers. The new schedule will cost the new customers about half as much as rates under the public utility district.

Former PUD employees of the PUD are now joining the private utility company's county organization.

In the picture at right, Alan Paine, right, general counsel for WWP, presents a check for the PUD properties to PUD Board Chairman Joe Carvey.

WWP said the election was won because of several factors, but one important influence was the fact that there was a genuine citizens' movement to make the change to the private company. Two leaders of the citizens were Jean L. Charbonnel, former bonding insurance inspector, and Ernest R. H. Sackman, a farmer. WWP employees made house-to-house calls to help.

• **Copies** of the Advance Construction Bulletin and the Advance Equipment Bulletin announcing work to be undertaken in the near future by the Bureau of Reclamation may be obtained by interested contractors from the Bureau of Reclamation office in Denver, Colo.

• **All major transmission** circuits from McNary Dam power house on the Columbia River to Oregon load centers of Western utilities served by Bonneville were completed last month. BPA energized two sections of 287-kv circuit into the Willamette Valley.

Bids and Contracts

• **Bonneville Power Administration** will award contracts in 1956 for $3,940,000 of transmission line equipment and construction, $1,812,000 for substation facilities and $1,094,000 for right-of-way clearance. The total of $6,846,000 compares with $5,219,000 spent in 1955 for construction.

• **Reynolds Metals** Co. has been awarded a Bonneville Power Administration contract for ACSR conductor and accessories for construction of the Alvey-Reston 230-kv transmission. The amount is $119,260. At the same time, **Bethlehem Pacific Steel** Co. was awarded a $154,756 contract for tower steel to build the Olympia-Shelton 115-kv No. 3, the Big Eddy-The Dalles 115-kv Nos. 1 and 2, and the Spokane

A PUD changes hands after sensational vote

to Hot Springs relocation. Low for clearing right-of-way and for construction of access roads to the Olympia-Shelton line was **I. N. Saimons,** Alderwood Manor, Wash., with a bid of $78,425.

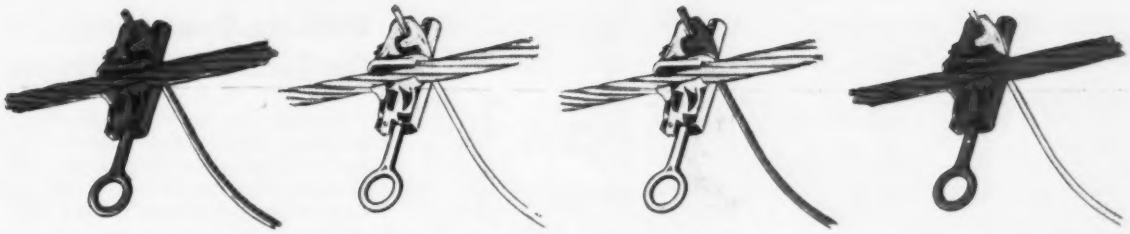
• **Gunthey & Shirley** and **E. V. Lane,** Palo Alto, Calif., were low bidders at $3,195,782 for 148 items of work on installation of equipment at The Dalles for the Corps of Engineers. The work is to be completed by Dec. 1, 1960.

• **Emp Electric** Ltd., London, with an offer of $34,590; **R&IE Equipment** Division of I-T-E Circuit Breaker, Portland, with an offer of $53,494, and **Schwager-Wood** Corp., Portland, with an offer of $37,970, were apparent low bidders on three schedules of Corps of Engineers contracts for design, manufacture and delivery of 115-kv and 230-kv electrical equipment for fishwater units one and two, and for main units 1 through 14 of The Dalles Dam power house.

• **Babcock & Wilcox** Co. has been awarded the first lump-sum contract to build reactor fuel elements in a privately owned facility. The company will supply 325 fuel element assemblies to replenish the core of the reactor of Phillips Petroleum Co., at Arco, Idaho.

• **Pacific Gas and Electric** Co.'s Helms Dam on the Kings River will be constructed by **Morrison-Knudsen** Co., Boise, **Walsh Construction** Co., San Francisco, and **B. Perini & Sons.,** Boston.

• **Sacramento Municipal Utility District** has awarded a contract to **Pennsylvania Transformer** Co., **George E. Honn** Co., San Francisco, distributor, for two 3,750 kva 67-12 kv, single circuit unit substations for delivery in June 1956. Price is $111,627.



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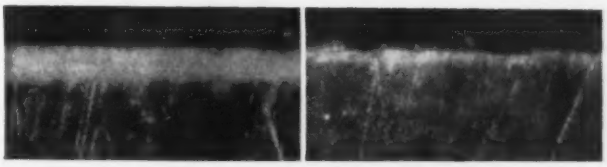

Micro-photo above compares Chance A.G.P. fortified cadmium coating (left) to commercial plating, one reason for A.G.P.'s success.

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Building Continuing On Tacoma's Cowlitz

Construction on the Cowlitz River project of Tacoma City Lights is virtually on schedule, despite the fact that litigation has prevented the city from selling a $15,000,000 bond issue to finance it.

Dean Barline, utilities director, told the city council the project can be financed for six to eight months without the bond issue. About 90% of the first dam, which is to cost about $37,000,000, can be constructed under a restraining order issued by Judge Charles T. Wright in Thurston County Superior Court.

The litigation has been brought by the state game and fish departments to block the project.

After the report by Barline, the city council unanimously approved the utilities board program.

Montana Power Protests Payment of 1955 Taxes

Montana Power Co. is contesting tax increases under a new reclassification law as "unlawfully and illegally levied," and is paying 1955 assessments under protest.

The new law requires that all counties reclassify property within their boundaries in accordance with state standards and it has drawn many protests. Because of the number of court cases filed, the Board of Equalization has pointed out the need for clarification of tax laws, preferably by a special tax court set up for the purpose.

Part of the protested tax paid by the company is for a classification and appraisal fund now being challenged in the courts.

• **Southern California Edison Co.** set a new company record by connecting 8,698 new meters to its lines in the month of October. The company expects to gain top position in the nation in 1955 for the number of meters connected. Estimated total for 1955 is 84,000.

• **Pacific Northwest Power Co.** is vigorously protesting the action of public power organizations that seek to block the PNP Mountain Sheep and Pleasant Valley projects on the Snake River. Strongly worded briefs have been filed with the Federal Power Commission listing the Northwest Public Power Assn., the National Hells Canyon Assn., Farmers Unions in Oregon, Idaho and Montana and the national Farmers Union as opponents.

PG and E Contracts for Wholesale Power Sales

Nine northern California cities have signed a seven-year contract for wholesale power with Pacific Gas and Electric Co. The contract serves to space out over a three-year period a rate increase authorized by the state public utilities commission in 1952.

Rate increases to the cities will occur in four steps, the first due at the expiration of their individual long-term contracts and the others spaced through three years to bring rates up to the 27% increase authorized.

Prior enforcement of the increase was blocked by long-term contracts with the cities.

Washington Commission May Build Atom Reactor

Thomas Quast, chairman of the Washington State Power Commission, told members of the state PUD association that the commission is considering a bid to the Atomic Energy Commission for a 30,000-kw atomic power reactor.

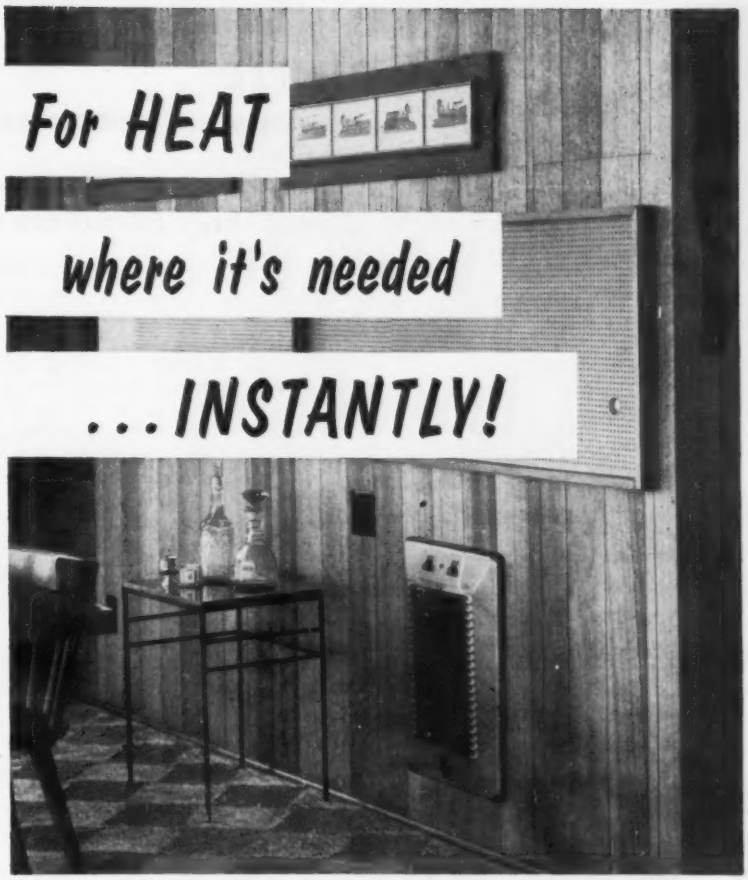
The type of reactor being considered is one in which liquid metal would provide superheated steam to temperatures of 2,600 F. Molten bismuth was mentioned as a heat exchanger.

Quast said the commission has been making studies of possible construction of steam plants as a partial solution to a forecasted power shortage in 1960. Cost of steam power, used in combination with dump power from the Columbia River, is estimated at $26.50 per kilowatt-year at the load site, as compared with $20 per kilowatt-year generating cost estimated for Priest Rapids Dam, with delivery at the dam.

The commission's interest in atomic powered plants has grown from the steam integration study.

• **Homer Electric** Assn. of Homer, Alaska, has received a $175,000 loan from the REA to extend lines some 25 to 30 miles from Homer to provide power to the communities of Cohoe, Soldotna and Kaislof. Power is provided by a 550-kw generating plant that will be increased to 1,500 kw within two years.

• **Washakie Rural Electric** Co., Worland, Wyo., has been granted a $71,000 REA loan to construct eight miles of distribution lines to serve 48 new customers, to erect a substation east of Worland and to make system improvements.



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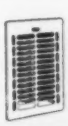
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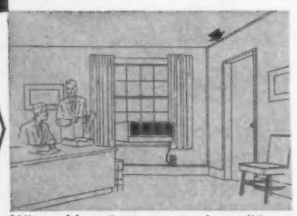

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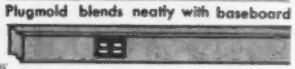

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NEWS ABOUT PEOPLE

Edison Personnel Moves Affect Three Executives

Three executive changes at Southern California Edison Co. were recently announced.

George N. Hawley, former vice-president in charge of commercial operations, has been promoted to vice-president and assistant to the president. John H. Mead, vice-president, will take over direction of the company's commercial department.

Joseph R. Brookshire, former assistant to the president, has been named assistant vice-president in charge of public and community relations.

• **Vernon D. Armstrong,** executive engineer of Sierra Pacific Power Co., retired in November after 30 years of service with the company.

• **Consulting engineers** who will work as an engineering board for Idaho Power Co.'s Snake River development are I. C. Steele, San Francisco, Dr. James P. Growdon, Pittsburgh, Pa., and Dr. Harold T. Stearns, Hope, Idaho.

• **Dr. Jesse E. Hobson,** director of Stanford Research Institute, has submitted his resignation effective March 31 for health reasons.

• **J. J. Stein** has been promoted from superintendent to assistant manager of the Grays PUD of Aberdeen, Wash. It was announced that he is to become manager upon the retirement of F. J. Robbins next year.

• **P. H. Adams,** former chief load supervisor of San Diego Gas & Electric Co.'s transmission and distribution department, is new manager at La Jolla. He succeeds **W. J. Gilmore** who retired Jan. 1. **Olen P. Trotter** takes over Adam's former position.

• **Howard Arnett** has been named executive assistant to Thomas W. Delzell, president of Portland General Electric Co.

• **New officers** of the Los Angeles Chapter of the Representatives are: **Vern T. Rupp,** president; **Norman J. Marshank,** vice-president; and **Jackson Edwards,** secretary-treasurer. Installation of the new officers was held Dec. 15.

• **C. G. Crawford,** former sales manager for the Pelton Water Wheel division of Baldwin-Lima-Hamilton Corp. in San Francisco, now moves to Philadelphia as sales manager for B-L-H hydraulic turbines and related equipment.

• **Malcolm M. Bridgwater,** recently named superintendent of system operations of Arizona Public Service Co., has been elected a vice-president of the company by the board of directors. He has been with the company since 1924.

• **Leonard A. Hobbs,** vice-president of Smoot-Holman Co., Inglewood, Calif., was recently elected to the board of trustees of the RLM Standards Institute Inc.

• **James B. Black,** chairman of the board of Pacific Gas and Electric Co., has been selected to be a trustee of the Ford Foundation. His appointment was announced by Henry Ford II.

Deaths

• **Chelsea C. Buford,** retired Sacramento, Calif., electrical engineer, died Dec. 22. He had retired six years ago after operating the Buford Electric Co. for 30 years. He was a member of the Sacramento County sheriff's posse and active in Sacramento civic affairs for many years.

• **David Greenleaf Martin,** 69, retired general auditor for the Pacific Gas and Electric Co., died Christmas Day at his Los Gatos, Calif., home. He had retired five years ago from PG and E service. He was prominent in Masonic work and the electrical industry.

• **Raymond E. Colby,** 64, chief city electrical inspector at Fresno, Calif., died at his home there Dec. 24. He was chairman of the West Coast section of the International Association of Electrical Inspectors and a member of Local 100 of the International Brotherhood of Electrical Workers. He is credited with many contributions toward strengthening the electrical ordinance of the city of Fresno.

Kelly Courtright Dies After Long Illness

• **H. H. "Kelly" Courtright,** 68, assistant to the president and general maanger of Pacific Gas and Electric Co., passed away at the Fresno Community Hospital Dec. 20 after a long illness.

He was also president of the Valley Electrical Supply Co., and for nine

Questions and Answers

about the

Pneu-Draulic Circuit Breaker Operator

Pneu-Draulic operators can be furnished on power oil circuit breakers from 14.4 kv, 500,000 kva to the largest.

Following are answers to questions that have arisen during discussions of the *Pneu-Draulic* operator. Perhaps they may answer some of the questions in your mind.

Q. What happens if the accumulator bag breaks?

A. While breakage is unlikely, surprisingly enough the breaker would continue to operate normally for a period of approximately a year. The high pressure oil would slowly absorb the nitrogen charge.

Q. How long will the accumulator bag last?

A. Allis-Chalmers had about ten years' experience with the identical accumulator on rock crushers without replacement. On these units there are about one million flexations of the bag each year.

Q. Can accumulator bladder pressure drop low enough due to extremely cold weather to prevent operator from closing breaker?

A. No. There is enough oil reserve in the reservoir to make up for any drop in nitrogen pressure in the accumulator.

Q. What maintenance will be required?

A. The very minimum. All that is required is that at least once each year the oil level in the reservoir and precharge pressure in the accumulator should be checked.

Q. The control valve is immersed in oil and shouldn't stick — but if it did when the ram was in the top position, could the breaker trip?

A. Since all Allis-Chalmers breakers are mechanically trip-free, the breaker would open at its normal operating speed.

Q. How much oil leakage can be expected?

A. Field experience to date proves no external leakage need be expected. Internal leakage from high to low pressure portion of system will be about .4 cubic inches per hour maximum. This means pump will operate about one minute in 24 hours.

Q. Is there danger to operating personnel if an oil line should break?

A. No more than with an air line in a pneumatic system. However, the greatest safety factors possible have been incorporated. From a pressure standpoint the *Pneu-Draulic* operator meets all requirements of the Joint Industrial Conference on Hydraulics and Army and Navy specifications; safety factor is 5 to 1, based on a 3000-psi system. In addition, a pressure relief valve is incorporated to prevent excessive pressure if pressure switch should fail to shut off pump.

If you have any further questions regarding the *Pneu-Draulic* operator, or would like a copy of the new Bulletin 71B7942, contact your nearby A-C office, or write Allis-Chalmers, Milwaukee 1, Wisconsin. A-4779

Pneu-Draulic is an Allis-Chalmers trademark.

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Your local G-E Service Shop makes old distribution transformers new again at about ⅔ the cost of new ones. Our drivers pick up your old or burned-out units. We rebuild them, uprate them, and deliver them to you with a new-transformer warranty. There are 31 G-E Service Shops throughout the country—one near you. 431-18

Progress Is Our Most Important Product

GENERAL ELECTRIC

years, until 1953, was manager of the San Joaquin division of the utility.

Kelly Courtwright went to Fresno in 1911 as a partner in the Modern Light and Fixture Co., one of the early lighting firms in that city, but in 1912 he had an opportunity to join the Valley Electrical Supply Co. as a department manager. In 1916 he was made vice-president and manager of the electrical firm, at that time a retail subsidiary of the San Joaquin Light & Power Co. In 1927 he became president of the Valley Electric.

After the merger of the San Joaquin Power with Pacific Gas and Electric Co., Valley Electrical Supply Co. moved out of the retail field and into the wholesale business, acting as San Joaquin Valley distributor of a nationally known line of appliances. This was a step Courtright had long anticipated because of his development of the "Through the Dealer" plan of appliance merchandising.

This plan that he developed won for him the James E. McGraw Award for Cooperation in 1928. He also won the A. G. Wishon Award for outstanding contributions to the success of the San Joaquin Light & Power Corp.

In 1944 Courtright was named manager of the San Joaquin division of PG and E, directing its operations throughout most of the valley and in San Luis Obispo and Santa Barbara Counties. He held that position until 1953 when he became assistant to the vice-president and general manager.

In 1955, Courtright was advanced to the position he held at the time of his death.

In recent years his duties have been primarily in connection with the successful negotiations with irrigation districts and others to make possible the start of construction on the $80,000,000 project on the north fork of the Kings River, now underway.

Besides being a member of many civic and fraternal organizations, Courtright was a member of the Northern California Electrical Bureau, the Society for Electrical Development of New York, and past director of the Pacific Coast Electrical Assn.

• **Thomas Benton Hunter Jr.**, prominent San Francisco consulting engineer, died at his home recently at the age of 75 years. He graduated from Stanford University in 1904. In 1905 he became chief engineer of the Pacific Improvement Co., Monterey, a position he held until 1911. He then established a consulting engineering service in San Francisco which led to participation in such California landmarks as Pasadena city hall, Palace Hotel and 35 buildings at University of California at Berkeley and Los Angeles.

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CORRECTIONS AND ADDITIONS

Manufacturers' Directory November 1955

Corrections—

MOE LIGHT DIV., THOMAS INDUSTRIES, 410 S. Third St., Louisville, Ky.—Kenneth D. Cummings, 983 Castle St., San Leandro, Calif.

MONITOR CONTROLLER COMPANY, 99 Grove St., Rockland, Mass.—This company is not represented by Campbell & George Co., 1601 Cortland, San Francisco, as shown in our Directory.

CAMPBELL & GEORGE CO., 1601 Cortland, San Francisco, Calif.—represents: Allen-Bradley Co., Automatic Control Co., California Wire Products Co., Eagle Signal Corp., Erie Electric Mfg. Co. Inc., Hagen Mfg. Co., Heinemann Electric Co., Kinney Electrical Mfg. Co., Lexington Electric Products Co., Roller-Smith Corp., Sorgel Electric Co.

Appliance Service and Repair Parts Directory—

EDWARDS CO. INC., Norwalk, Conn., Los Angeles: R. A. Vaill, 2500 W. 6th St. (57). San Francisco: W. L. Pierce Jr., 617 7th St. (3).

The WESTERN STATES and HAWAII represent 20% of your total market for electrical equipment and supplies — For thorough advertising penetration of this rich market there is no better medium than ELECTRICAL WEST, 68 Post St., San Francisco 4, Calif.

NOTES ON THE TRADE

• **General Electric** Co.'s announcement of a new incandescent lamp was carried via closed circuit television from Nela Park to Portland, Seattle, Denver, San Francisco and Salt Lake City in the West. It was estimated that 20,000 or more people witnessed the announcement across the nation.

• **All-Brite Fluorescent Fixtures** of California announces that **R. E. Liepold** has been appointed assistant to the vice-president; **Fred J. Bertoloni** is head of office sales and **Marvin H. Ray** is new chief of quotations. Staff of the company is increasing, as is the size of the plant in South San Francisco.

• **Westinghouse Electric** Corp. has appointed **Karl K. Lacher** as an apparatus sales engineer at the Intermountain district headquarters at Salt Lake City. He succeeds **Clifford W. Colman,** who advances to an area sales manager's position in the Central Pacific district headquarters at San Francisco.

• **Robert A. Young** is new Pacific Coast manager for the Kerite Co. He has been associated with the company as manufacturer's representative since 1946 and will continue with his own business. He has been in electrical industry sales and engineering for the past 30 years, 28 on the West Coast.

• **S. W. Scott,** Pacific district manager for Graybar Electric Co., has been elected a director of the company.

• **Malarkey Plastics Division** of M&N Wood Working Co., Portland, now has a line of plastic pipe and fittings for residential, industrial and farm uses. Initially the pipe will be sold in Idaho, Oregon, northern California, Montana and Washington.

• **Cable Makers** is the title of a new motion picture available on free loan from Rome Cable Corp., Rome, N.Y. It is 16-mm sound and color.

• **Kaiser Aluminum & Chemical** Corp., Oakland, has announced a $280,000,000 expansion program that will bring total primary aluminum production capacity up to 654,000 tons a year. Two major additions are to be in West Virginia and Louisiana.

MALLEABLE
Integral Spur
GUY HOOKS

Exclusive
CONICAL SPUR

Does away with the need for a lag screw!

Linemen like them — they're easier to mount, require one less piece to juggle.

Troubleshooters like them — they eliminate TV and radio interference caused by loose contact between lag screw and guy hook.

Maintenance men like them — they require less replacements.

Storekeepers like them — there's one less piece to order, to stock and to handle.

Purchasing agents like them — they cost less than a separate guy hook and a lag screw.

Field tested and proved the most economical and serviceable guy hook available — and they're **malleable iron** to outlive, outwear, outlast plain carbon steel hardware, castings, stampings or forgings.

	Max. Bolt Dia.	Max. Strand Dia.	Thimble Dia.
Model P135AX	5/8"	7/16"	1 7/16"
Model P133AX	3/4"	1/2"	1 9/16"
Model P132X	7/8"	3/4"	2 5/8"

SAMPLES AVAILABLE UPON REQUEST

MALLEABLE IRON FITTINGS COMPANY
Pole Hardware Division Branford, Connecticut
N.Y. Office: 30 Church St.
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MIF

Representatives: William J. Cottrell Co., Portland, Ore. • James H. Drew Corp., Indianapolis, Ind. • Industrial Engr. & Equip. Corp., Los Angeles, Cal. • JSG Electric Co., Chicago, Ill., Lee-Smith Co., Miami, Fla. • B. H. McCoin, Knoxville, Tenn. • William J. O'Brien, Memphis, Tenn. • Robert P. Smith & Co., Jacksonville, Fla., E. A. Thornwell, Inc., Atlanta, Ga. • J. P. Voight, Summerville, S. C. • Waltham, DeWitt & Krusi, San Francisco, Cal. • L. G. Wendegatz, Kansas City, Mo. • Williamson Sales Co., Shreveport and New Orleans, La.; Dallas, Houston, Tex.; Pine Bluff, Ark. • O. C. Witte Co., Detroit, Mich.

Matt Cabot stands by, Mrs. O. C. Klingsick presses button to start new Day-Brite plant

Day-Brite Dedication Launches New Plant

Day-Brite Lighting Inc. dedicated its new fixture assembly plant at 530 Martin Ave., Santa Clara, Calif., Dec. 3, with about 300 business, industry and civic representatives on hand.

Mrs. O. C. Klingsick, daughter-in-law of one of the company's founders, pressed the button that activated the plant, which in turn began producing Day-Brite's 4,830,732nd fixture, as nearly as officials could determine.

Host and master of ceremonies at the event was Matt Cabot, Western regional sales manager. The plant will serve the 11 Western states and Hawaii and Alaska. James F. Whitehead Jr., vice-president in charge of sales for Day-Brite, was principal speaker.

The new plant is a well-lighted, 30,000-sq-ft building, with assembly lines capable of turning out as many as 800 fixtures daily. The manufacture of fixture components takes place at other Day-Brite plants.

• **Johns-Manville,** in a reorganization move effective Jan. 1, split the industrial division into three divisions: pipe, insulation and packing & friction materials. The new Pacific region of the pipe division includes the states of California, Arizona and Nevada. **H. B. Heyn** is regional manager, with headquarters in Los Angeles, and **J. H. Petersen** is assistant regional manager with headquarters in San Francisco. Staff manager of division dealer sales is **Henry Bruner. Monroe Harris** will be staff manager of direct and irrigation sales, and **Harold Olsen** will have a similar position in the southern part of the division.

• **Peerless Supply** Co. has moved to 3259 17th Ave. W., Seattle. New quarters have 15,000 sq ft, railroad spur and parking facilities. The company is distributor of Federal panels, conduit and lighting fixtures.

• **S. F. Lighting & Supply,** San Francisco, is the northern California distributor of Sylvania Electric Products Inc.'s new Scott line of lighting fixtures.

• **Cadillac Plastic** Co. has opened new offices and warehouse at 652 Polk St., San Francisco. **Ted Harrigan** is manager of the new branch, working under **Eugene Quinn,** West Coast manager for the company.

• **James D. Crowder** is now a salesman for National Electric Products Corp., Seattle. He formerly held a clerical position with the company.

• **Grant Edgel** Co., Portland, now represents the Wheelco Instruments division of Barber-Colman Co. in the Portland area.

• **A. B. Chance** Co. has purchased 51% of the stock of the Porcelain Products Co., manufacturer of insulators and other porcelain parts used by the electrical industry.

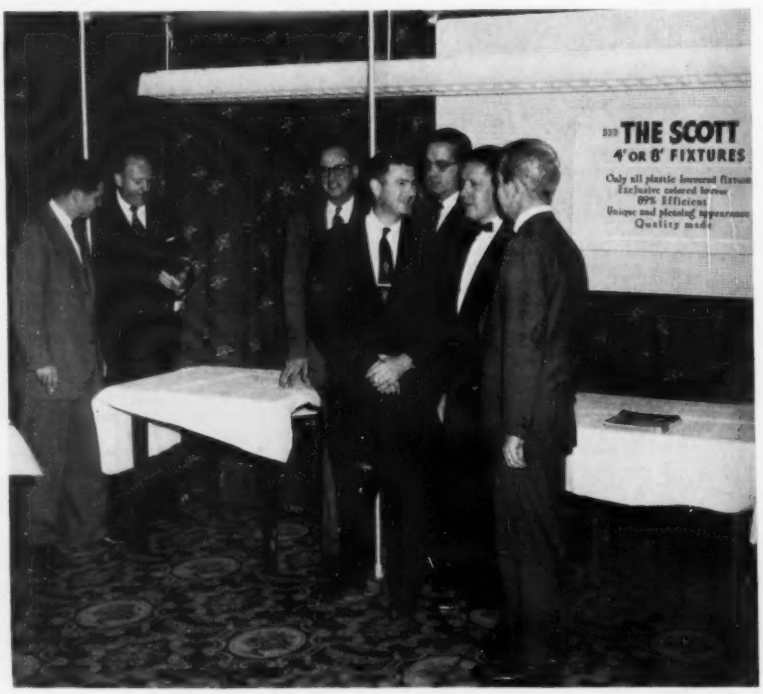
• **Murray McBride** has been named general sales manager of Eaton Metal Products, with headquarters in Denver.

• **A Progress Report on G-E Mica Mat** is the name of a color-and-sound movie about General Electric's mica mat, a new electrical insulation material. Information on the availability of the film is available from G-E Laminated & Insulating Products Department, section NR-1, Coshocton, Ohio.

• **Morrey Products** Co., Seattle, and **West Coast Industrial Sales,** San Francisco, are now distributors of the Demo portable electric rotary hammer, according to an announcement from Demo Tool Corp., Los Angeles.

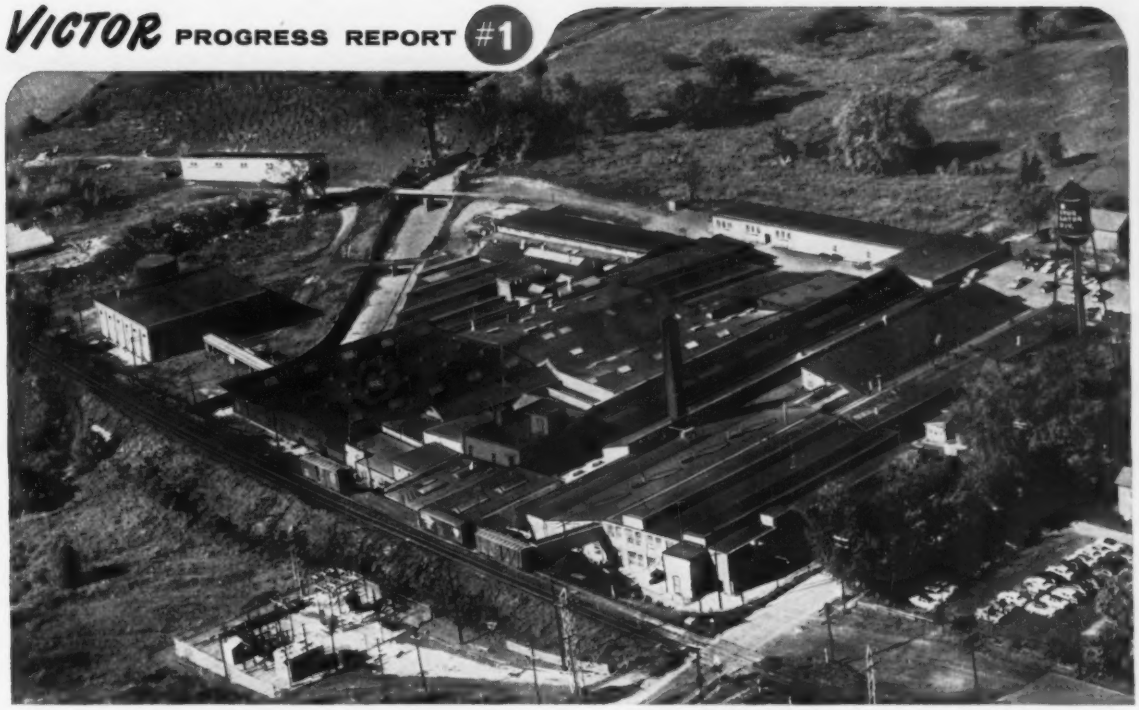
• **Man of Action** is the name of a film about slum clearance available from Association Films' regional library on free loan. It is sponsored by the American Council to Improve Our Neighborhoods (ACTION), Box 500, Radio City Station, New York 20. N.Y.

• **Pacific Utilities Supply Co.,** has announced a move to new offices and warehouse facilities at 605 Third St., San Francisco. New phone number of the firm is YUkon 6-1625, which will not be in local telephone books. K. M. Ryals is president and Roland K. Grannis is vice-president of sales.



Looking over the new Scott line of lighting fixtures of Sylvania Electric Co. are, left to right, Bob Harper, Western regional manager of lighting; Don Billings, manager of lighting, San Francisco Lighting Co.; Charles Dickenson, West Coast national accounts manager; Henry Soucielle, lighting division representative; Leonard Komor, district lighting engineer; Kim Hayes, West Coast credit manager; and Bill Chapman, lighting representative. Showing was in San Francisco at an open house and buffet attended by 600

VICTOR PROGRESS REPORT #1



Portion of Victor plant outlined in red has been added since 1948.

VICTOR expands plant area 20%

TO MEET INCREASED INSULATOR DEMAND

"BETTER INSULATORS THROUGH RESEARCH"

Sixty-three years ago the manufacture of wet process porcelain insulators began at VICTOR. Since then, the plant facilities at VICTOR have had to expand continually to meet increased demand. In fact, during the last seven years alone, VICTOR has had to enlarge its plant area 20% to provide greater facilities for switch and bus insulator, bushing and special porcelain manufacture, raw material storage, for new ceramic and electrical laboratories and in-plant loading docks. VICTOR'S modern plant, engineering and research facilities are unsurpassed in the industry! You just can't buy better insulators!

SPECIFY VICTOR

Purified Porcelain Insulators!

VICTOR INSULATORS DIVISION
I.T.E CIRCUIT BREAKER CO.
VICTOR, N. Y.

Low and High Voltage Pintypes • Suspensions • Guy Strains
Spools • Switch and Bus Insulators • Custom Designed Porcelain
Insulator Hardware

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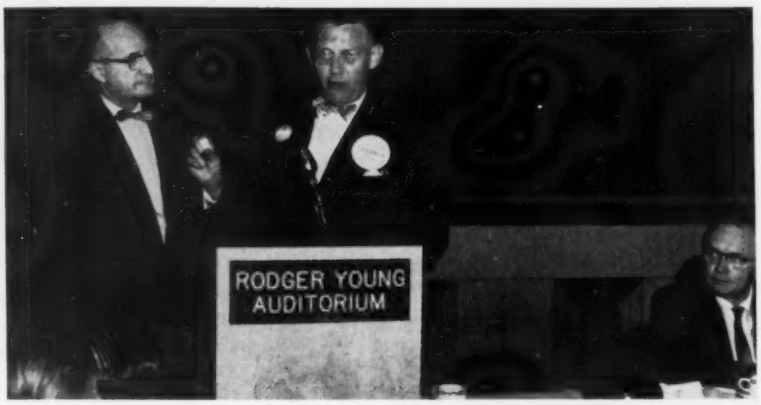

Charles D. Gibson of the California State Department of Schoolhouse Planning received pin and certificate of a Fellow in the membership grade of the Illuminating Engineering Society from Roy H. Kreyser, chairman, Southern California Section. At the same meeting J. S. Hamel, right, consulting engineer, described the special lighting effects he had designed at Disneyland

H. E. von Kahrs was appointed Motorola regional sales manager in the states of Oregon and Washington with headquarters in Seattle. He formerly was with Westinghouse in southern California, Utah and Arizona and at one time was with a Los Angeles TV and appliance company. In his new position he will supervise distributor sales, merchandising, consumer products service activities

Receiving certificates of graduation after three and four years of courses in theory, practice and on-the-job training are nine journeymen of the Salt River Power District. In front, from left, are Louis Q. Thomas, electrician; Allen M. Willard, machinist; Victor I. Corbell, president; John L. Sims, electrician. In back are Seth C. Bazzill, relayman; Eldred Broeder, lineman; Jesus P. Felix, lineman; Marvin Delk, lineman, and Earl J. Smith, auto mechanic. Clay Bates, lineman, was hospitalized at the time of graduation

Every day's a Sun-Day at this school!

Its built-in sunshine is better than daylight and actually helped cut construction costs

The electric lighting you see below was designed to keep young eyes bright. The luminous ceiling, with its slim-line, fluorescent tubes above plastic diffusers, gives the room a cheerful, out-of-doors feeling, regardless of weather conditions. And does it without glare or excessive brightness contrasts. Students enjoy soft, shadowless lighting that's at once ideal for deskwork or for more distant viewing.

And how about cost? Well, this lighting had actually paid for itself before it was ever put in. For it enabled the architect to plan a building that was much cheaper to construct than one dependent on large amounts of natural light. The over-all saving on the completed school was several thousand dollars.

P. G. and E. lighting engineers will gladly check existing school lighting, at the request of school authorities, or help architects and builders plan lighting for new schools. A call to your local P. G. and E. office is all it takes.

● UNRETOUCHED PHOTOS, TAKEN WITHOUT FLASH BULBS

FOR FREE PLANNED LIGHTING ADVICE, CALL YOUR NEAREST P. G. AND E. OFFICE TODAY

P·G and E·
Pacific Gas and Electric Company

Adequate Wiring is your business

. . . if you want business!

Breathes there the man who is interested only in the business he already has . . . and no more? That man—if such there be—can leave the promotion of Adequate Wiring to others.

He's the *only* one who can, though! Everyone in every phase of the electric industry who *does* want new business should make Adequate Wiring a part of every sale . . . yes, even if it isn't required for immediate use.

Adequate Wiring is *basic* . . . the foundation for your next sale, the one following and the one after that. It is *your* business . . . if you want business!

The Red Seal Certified Adequate Wiring Program is one of the activities carried on by PCEA for the betterment of the entire electric industry. Your participation in this and other activities is cordially invited. Get full information from either office.

CERTIFIED ADEQUATE RED SEAL STANDARD WIRING

Pacific Coast Electrical Association

530 West Sixth Street, Los Angeles 14, California
681 Market Street, San Francisco 5, California